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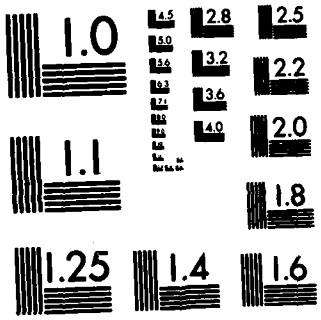
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MR 82-10

Sand Resources on the Inner Continental Shelf off the Central New Jersey Coast

by

Edward P. Meisburger and S. Jeffress Williams

MISCELLANEOUS REPORT NO. 82-10

OCTOBER 1982

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U.S. ARMY, CORPS OF ENGINEERS
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER MR 82-10	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) SAND RESOURCES ON THE INNER CONTINENTAL SHELF OFF THE CENTRAL NEW JERSEY COAST		5. TYPE OF REPORT & PERIOD COVERED Miscellaneous Report 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Edward P. Meisburger S. Jeffress Williams		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Department of the Army Coastal Engineering Research Center (CEREN-GE) Fort Belvoir, Virginia 22060		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS C31665
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army Coastal Engineering Research Center Kingman Building, Fort Belvoir, Virginia 22060		12. REPORT DATE October 1982 13. NUMBER OF PAGES 48
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Geomorphology; New Jersey coast; Sand resources; Sediments; Seismic reflection		

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

About 1800 square kilometers of the central New Jersey inner shelf between Avalon and 7.5 kilometers north of Barnegat Inlet was surveyed to assess and quantify marine sand and gravel resources 6 meters below the sea floor. The primary data consist of 1133 kilometers of high-resolution seismic reflection profiles, limited side-scan sonar coverage, and 97 vibracores, a maximum of 6 meters long. Limits of the surveys were generally from about the -7-meter depth contour seaward to about the -21-meter depth contour, a maximum of some 22 kilometers offshore. (continued)

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Analyses of the survey data reveal that an estimated 172 million cubic meters of suitable sand is present in 15 different locales. Most of the sand is contained in linear and arcuate shoals that appear to be Holocene to modern in age. The shoals are resting on a pre-Holocene age substrate composed of sedimentary deposits of fluvial origin. These deposits show evidence of past subaerial erosion.

PREFACE

This report is one of a series which describes results of the Inner Continental Shelf Sediment and Structure (ICONS) study. The preliminary objective of the ICONS study is locating and delineating offshore sand and gravel deposits suitable for beach restoration and maintenance. The subject of this report is three survey areas off the central New Jersey coast. The work was carried out under the U.S. Army Coastal Engineering Research Center's (CERC) Barrier Island Sedimentation Studies work unit, Shore Protection and Restoration Program, Coastal Engineering Area of Civil Works Research and Development.

This report was prepared by Edward P. Meisburger and S. Jeffress Williams, CERC geologists, under the general supervision of Dr. C.H. Everts, Chief, Engineering Geology Branch, and Mr. N. Parker, Chief, Engineering Development Division. Original copies of all the seismic records from the Barnegat and Little Egg surveys are stored at CERC. The cores from these surveys are in a repository at the U.S. Geological Survey in Reston, Virginia. The records and cores from the Ocean City to Avalon survey are at the U.S. Army Engineer District, Philadelphia.

Technical Director of CERC was Dr. Robert W. Whalin, P.E., upon publication of this report.

Comments on this publication are invited.

Approved for publication in accordance with Public Law 166, 79th Congress, approved 31 July 1945, as supplemented by Public Law 172, 88th Congress, approved 7 November 1963.

TED E. BISHOP
Colonel, Corps of Engineers
Commander and Director

CONTENTS

TABLES

FIGURES

CONTENTS

FIGURES--Continued

CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U.S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	by	To obtain
inches	25.4	millimeters
	2.54	centimeters
square inches	6.452	square centimeters
cubic inches	16.39	cubic centimeters
feet	30.48	centimeters
	0.3048	meters
square feet	0.0929	square meters
cubic feet	0.0283	cubic meters
yards	0.9144	meters
square yards	0.836	square meters
cubic yards	0.7646	cubic meters
miles	1.6093	kilometers
square miles	259.0	hectares
knots	1.852	kilometers per hour
acres	0.4047	hectares
foot-pounds	1.3558	newton meters
millibars	1.0197×10^{-3}	kilograms per square centimeter
ounces	28.35	grams
pounds	453.6	grams
	0.4536	kilograms
ton, long	1.0160	metric tons
ton, short	0.9072	metric tons
degrees (angle)	0.01745	radians
Fahrenheit degrees	5/9	Celsius degrees or Kelvins[1]

[1]To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use formula: $C = (5/9)(F - 32)$.

To obtain Kelvin (K) readings, use formula: $K = (5/9)(F - 32) + 273.15$.

SAND RESOURCES ON THE INNER CONTINENTAL SHELF OFF THE CENTRAL NEW JERSEY COAST

by

Edward P. Meisburger and S. Jeffress Williams

I. INTRODUCTION

The construction, improvement, and periodic maintenance of beaches and dunes by the placement of suitable sand along the shoreline is an important means of counteracting coastal erosion and of enhancing recreational facilities (U.S. Army, Corps of Engineers, Coastal Engineering Research Center, 1977[1]). In recent years, it has become increasingly difficult to obtain large volumes of suitable sand from lagoons and land-based sources for this purpose because of economic and ecological factors. Accordingly, the Coastal Engineering Research Center (CERC) initiated an Inner Continental Shelf Sediment and Structure (ICONS) study to locate offshore sand resources suitable for beach nourishment. This report, part of that effort, deals with the location and physical characteristics of offshore sand deposits on the inner shelf adjacent to the central New Jersey coast. It is the third report in the CERC series on sand resources off the New Jersey coast.

The study area is a 1800-square kilometer zone, 13 to 22 kilometers wide, adjacent to the shore which extends from Avalon north to 7.5 kilometers north of Barnegat Inlet (39°00' N. to 39°50.0' N.) (Fig. 1). Survey data collected by CERC from the Barnegat Inlet and Little Egg Inlet regions consist of 953 trackline kilometers of seismic reflection profile and 67 sediment vibracores ranging from 0.34 to 3.75 meters long (Figs. 2 and 3). The data from the Ocean City region (Fig. 4) were collected by a private contractor with the U.S. Army Engineer District, Philadelphia. CERC collected and analyzed 180 kilometers of seismic and side-scan sonar data and 30 cores from 2 to 6 meters long and averaging 4.2 meters. These data were supplemented by National Ocean Survey (NOS) hydrographic data and pertinent scientific and technical literature.

Parts of this report dealing with the Barnegat and Little Egg Harbor survey areas are primarily the result of a reconnaissance effort; seismic line spacing and core density are not suitably detailed for reliable delineation of borrow sites. Consequently, further study of promising locales in these areas is needed before selection or use in project design and construction. The Ocean City survey was designed to evaluate sand availability for a specific beach-fill project and therefore may be considered final.

II. SETTING

The inner shelf off central New Jersey is a topographically and geologically complex region (Figs. 5, 6, and 7). The principal topographic elements

[1]U.S. ARMY, CORPS OF ENGINEERS, COASTAL ENGINEERING RESEARCH CENTER, *Shore Protection Manual*, 3d ed., Vols. I, II, and III, Stock No. 008-022-00113-1, U.S. Government Printing Office, Washington, D.C., 1977, 1,262 pp.

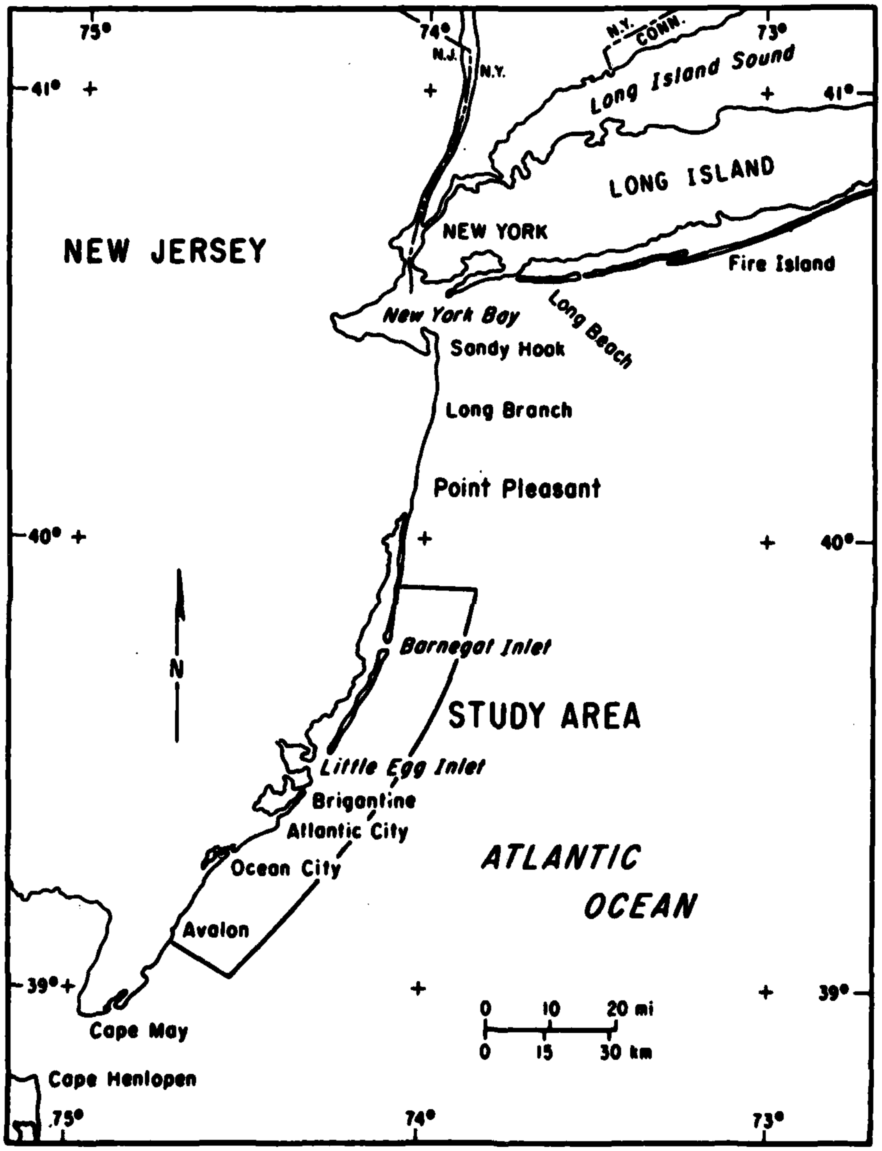

Figure 1. Central New Jersey study area.

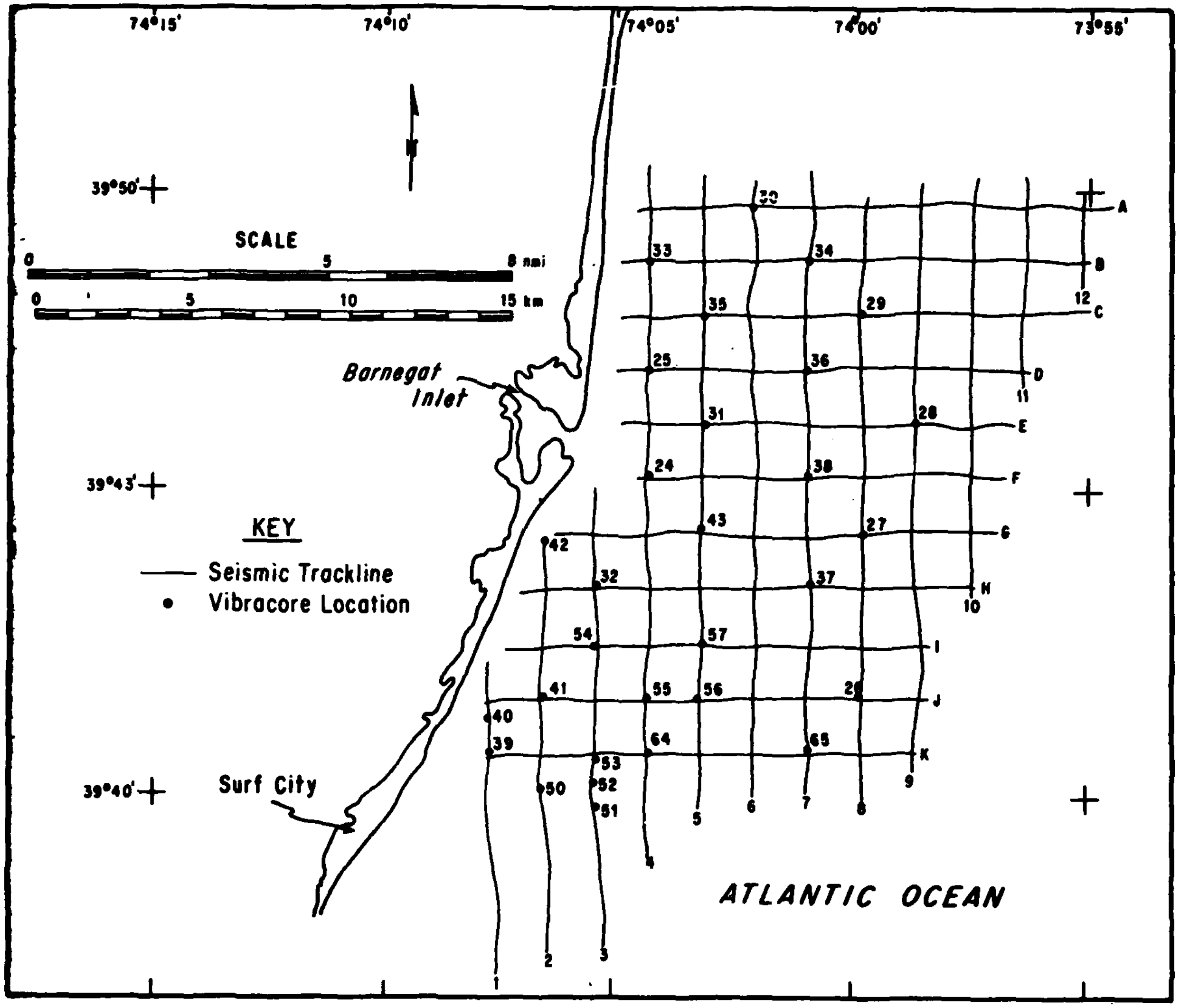

Figure 2. Location of seismic reflection profiles and vibratory cores in the Barnegat Inlet, New Jersey, area.

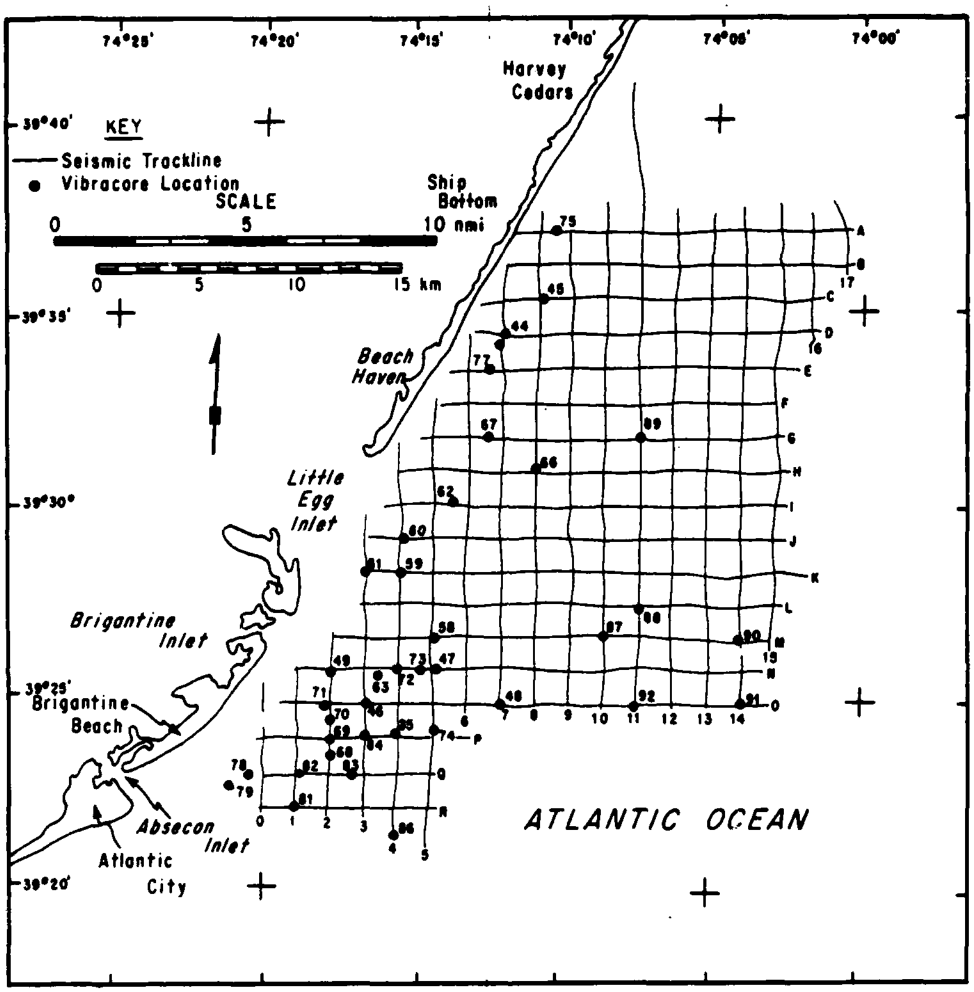

Figure 3. Location of seismic reflection profiles and vibratory cores in the study area from Ship Bottom to Atlantic City, New Jersey.

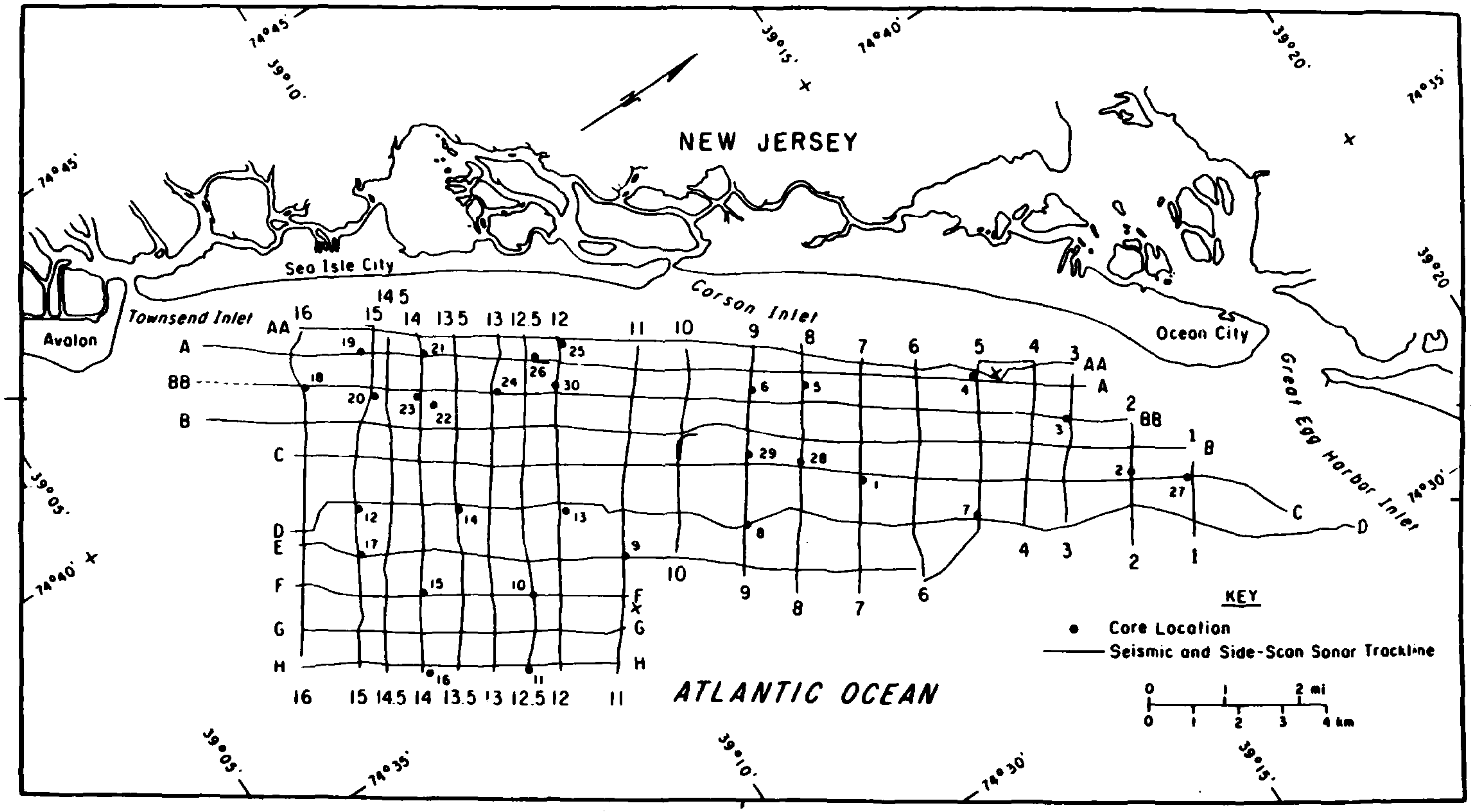

Figure 4. Location of seismic reflection profiles and side-scan sonar records as well as vibracores used to assess sand resources on the shelf off Ocean City to Avalon segment of the New Jersey coast.

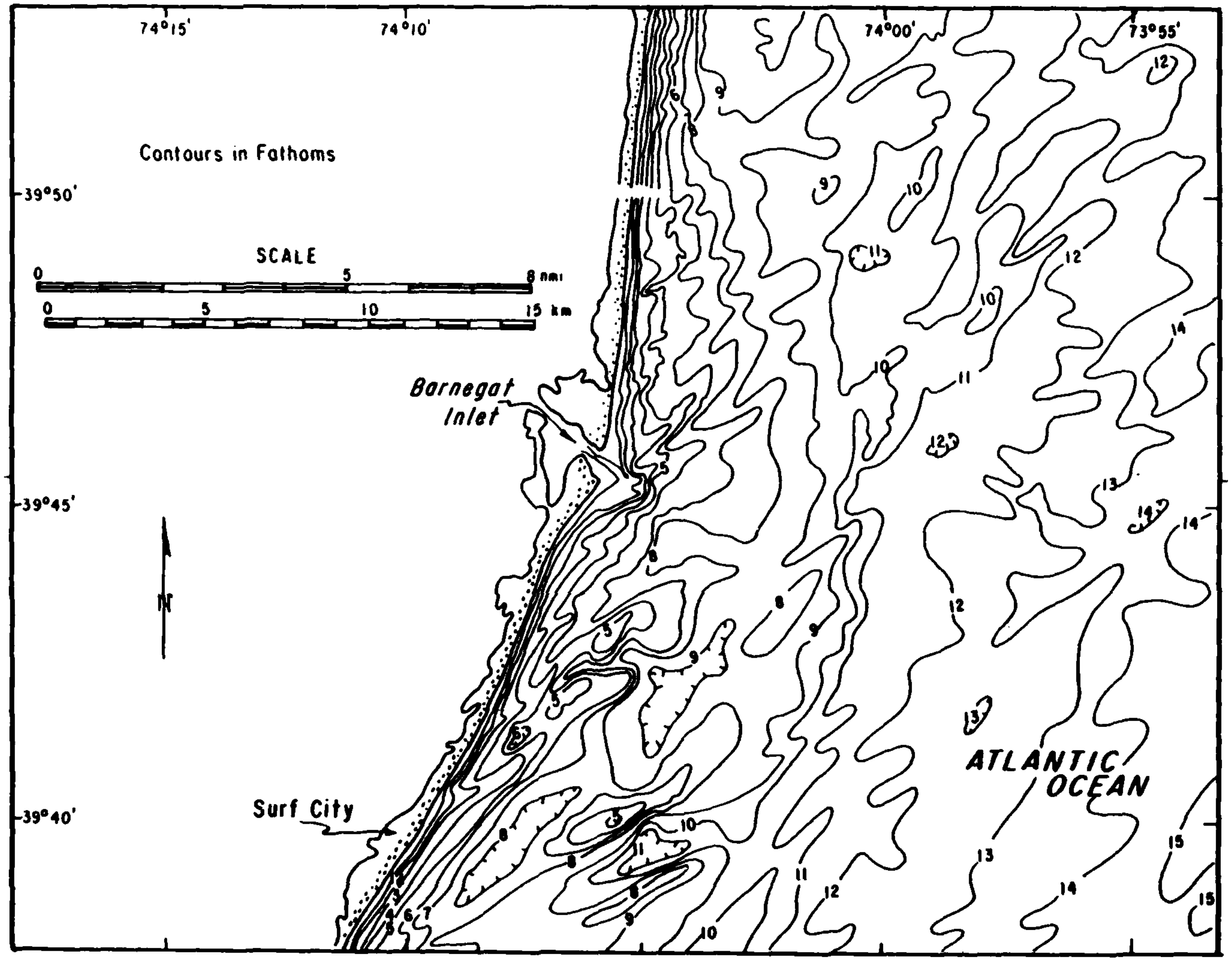

Figure 5. Bathymetric map of the inner shelf off Barnegat Inlet, New Jersey.

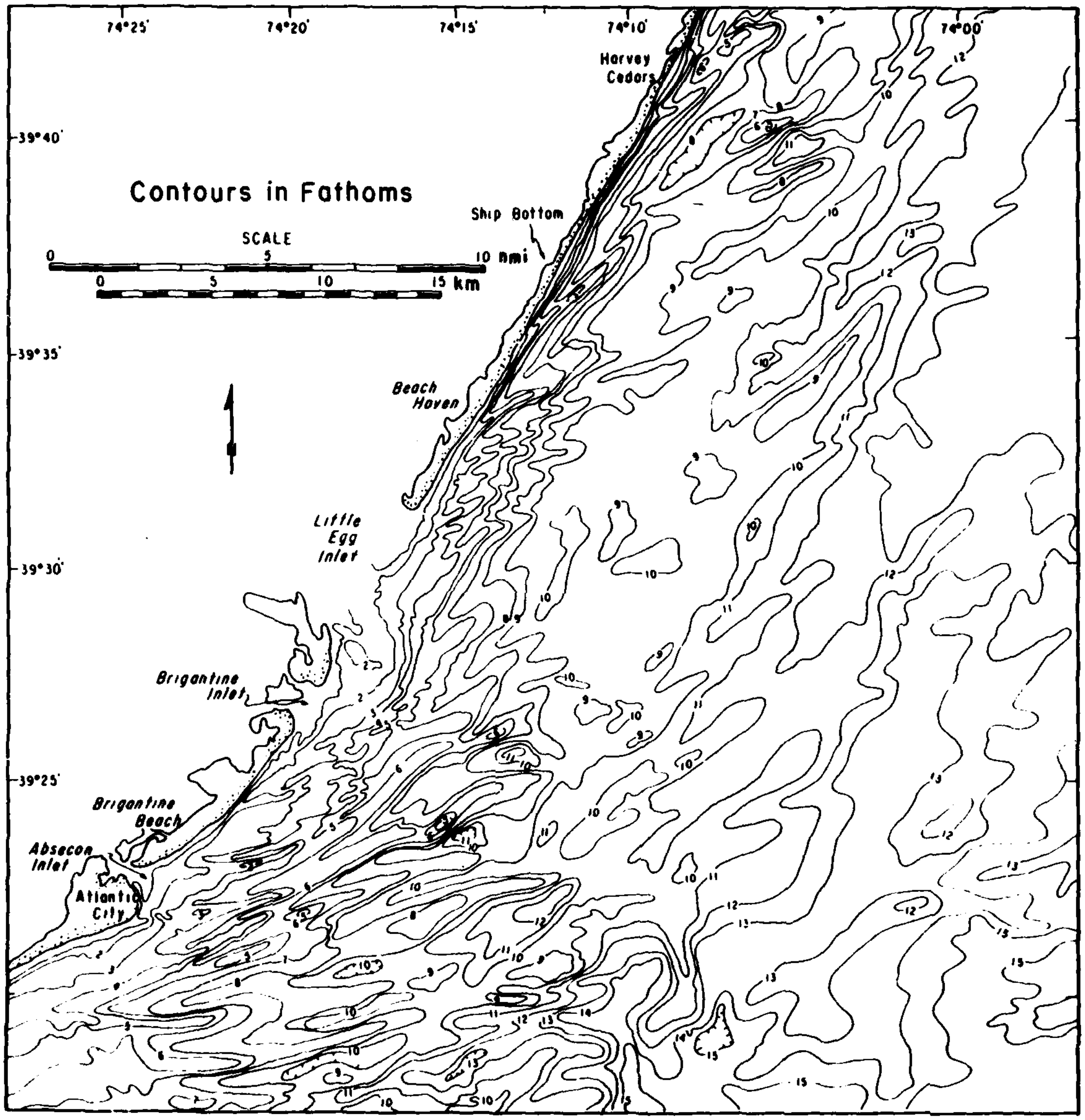

Figure 6. Bathymetric map of the shelf from Harvey Cedars to Atlantic City, New Jersey.

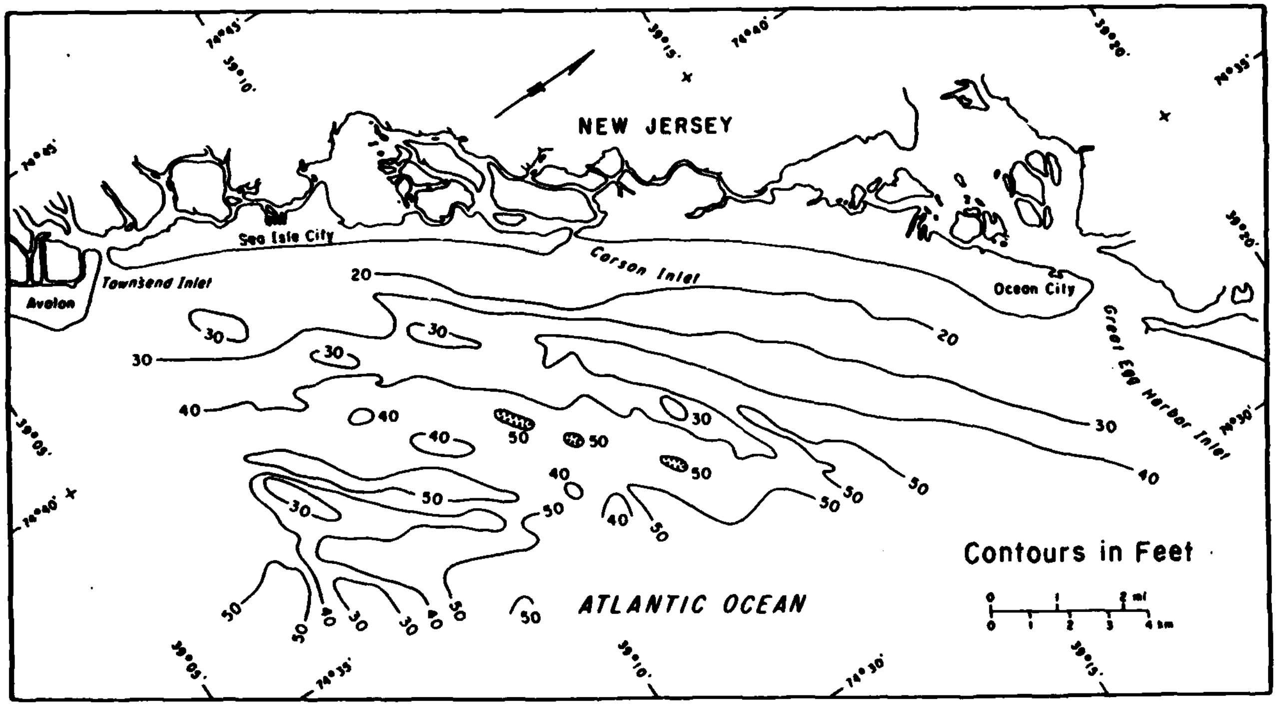

Figure 7. Bathymetric map of the study area south of Ocean City to Avalon, New Jersey.

are the shoreface and the adjacent inner shelf sea floor. Secondary elements, which consist mostly of inlet-associated shoals and linear-type sand shoals, create the irregular bottom topography characteristic of this region. The linear shoals occur both as projections from the shoreface and as isolated shoals on the inner shelf floor (Duane, et al., 1972[2]). Their relief of several meters and lengths to several thousand meters offer the highest potential for sand resources.

The coast adjacent to the study area is composed of sandy, low-lying barrier islands which are backed by narrow and shallow lagoons; the islands are divided in several places by tidal inlets.

Sediments recovered in CERC cores from the study area are described in the visual logs in Appendix A. In the logs and elsewhere in this report particle-size descriptions follow the Wentworth scale (Table 1). Grain-size data for selected sand-size samples from the cores are contained in Appendix B. Reduced line profiles of selected seismic reflection are in Appendix C. Most of the sediments from the study area can be grouped into a number of characteristic types on the primary bases of grain size and mineral composition. These categories are summarized in Table 2. Letters designating the sediment classes are used in the core log descriptions to identify the core intervals occupied by sediment conforming in general to the type description. Sediments which do not conform to any of the types are identified by the letter U. Similarities between sediments in a particular category do not necessarily indicate a stratigraphic relationship; in many cases they may be due to similarity in source and environment of deposition.

The various sediment types found in the study area are largely consistent with the class categories described by Meisburger and Williams (1980)[3] for the Cape May area. Consequently, the letter designators and category descriptions in Table 2 of this report are about the same, with only minor changes, as those of the Cape May report.

The typical surficial sediment in most of the study area is light brown quartz sand containing relatively small amounts of mollusk shell fragments. Locally, there are admixtures of granules and rounded pebbles which, for the most part, consist of rock fragments. Most of the surficial sediment appears to be of modern to Holocene age and was deposited and reworked by nearshore processes from the last transgression of the sea to the present. The surficial sediments are thickest in shoal areas and become relatively thin and locally discontinuous between shoals where older pre-Holocene sediments

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[2]DUANE, D.B., et al., "Linear Shoals on the Atlantic Inner Continental Shelf, Florida to Long Island," *Shelf Sediment Transport*, Dowden, Hutchinson, and Ross, Inc., Stroudsburg, Pa., 1972, pp. 447-498 (also Reprint 22-73, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., NTIS 770 172).

[3]MEISBURGER, E.P., and WILLIAMS, S.J., "Sand Resources on the Inner Continental Shelf of the Cape May Region, New Jersey," MR 80-4, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., July 1980.

Table 1. Grain-size scales--soil classification (modified from U.S. Army, Corps of Engineers, Coastal Engineering Research Center, 1977[4]).

Unified Soils Classification	ASTM Mesh	mm Size	Phi Value	Wentworth Classification
COBBLE				BOULDER
		256.0	-8.0	
				COBBLE
		76.0	-6.25	
COARSE GRAVEL				
		64.0	-6.0	
				PEBBLE
		19.0	-4.25	
FINE GRAVEL				
	4	4.76	-2.25	
SAND coarse				
	5	4.0	-2.0	
				GRAVEL
	10	2.0	-1.0	
SAND medium				SAND very coarse
	18	1.0	0.0	
				SAND coarse
	25	0.5	1.0	
				SAND medium
	40	0.42	1.25	
SAND fine				
	60	0.25	2.0	
				SAND fine
	120	0.125	3.0	
				SAND very fine
	200	0.074	3.75	
SILT				
	230	0.062	4.0	
				SILT
		0.0039	8.0	
CLAY				CLAY
		0.0024	12.0	
				COLLOID

[4]U.S. ARMY, CORPS OF ENGINEERS, COASTAL ENGINEERING RESEARCH CENTER, op. cit., p. 7.

Table 2. Primary sediment classes from the central New Jersey shelf.

Type	Lithology	Description
A	Quartz sand	Typically very pale brown (10 yr 7/3)[1], fine to coarse grain size; 1 to 5 percent shell (predominantly *Spisula*), well to poorly sorted; silty in places but predominantly clean; granules present locally.
B	Sand and gravel	Typically variable grayish-brown color; sand, granules, and pebbles; shells comprise 1 to 10 percent; generally very poorly sorted; often silty, which occurs in thin layers in most places; frequently consists of reworked substrate.
C	Silt and silty clay	Typically gray (5 yr 6/1) but occasionally brownish gray; mostly barren but contains shells in places; washed residue may contain sand, mica, and pieces of vegetation.
D	Clean to silty sand	Typically grayish brown (10 yr 6/1 to 10 yr 7/2); occasionally yellowish or reddish-yellow, very fine to fine sand; generally well sorted; micaceous locally.
E	Sand and gravel	Typically very light gray (5 yr 7/1) but often grayish to reddish brown; very poorly sorted sand, predominantly quartz; granules and pebbles consist mostly of quartz and rock fragments.
F	Quartz sand	Typically very light gray (5 yr 7/1) but often grayish to reddish brown; very similar to type E but with little or no gravel; poorly sorted, quartz predominant mineral.

[1]Munsell Soil Color Code (Munsell Soil Color Charts, 1944 ed., Munsell Color Co., Inc., Baltimore Md.).

often crop out. The composition and textural properties of the surficial layer suggest that it is derived from erosion and reworking of the pre-Holocene substrate.

Below the surficial sediments are diverse sediment deposits ranging from organic-rich mud to gravel. Many are thin bedded and appear to have little lateral extent. Few of these deposits contain mollusk shells and shell fragments or other calcareous organic particles. Some are yellowish brown, which suggests that they may have been deposited in a subaerial setting or have been exposed to leaching subsequent to their deposition. The heterogeneous character, extremely poor sorting, and oxidation type color of the coarser subsurface deposits, as well as the presence of channellike subbottom reflectors on the seismic records, suggest a fluvial origin.

III. POTENTIAL BORROW AREAS

Analyses of the geophysical records and vibracores identified 15 potential borrow areas where sand judged suitable for beach nourishment may be recovered. The areas are identified by letters A to O in Figures 8, 9, and 10. Tables 3 and 4 provide a summary of the pertinent information for the 15 borrow areas. Volume calculations were made for the Holocene marine sand deposits where seismic reflection and topographic control were sufficient for a reasonably reliable estimate. In addition, 10 cores at isolated sites contained suitable sand but additional data are needed to fully evaluate them. Table 5 contains data on these sites, identified by core number, where the specified core recovered potentially usable sand from deposits which were not associated with any discernible topographic or seismic reflection features. For this reason the core data could not be projected beyond the immediate area of the core site and no area or volume calculations could be made. Some of these sites contain Holocene marine sand (type A) which does not seem to be associated with a prominent shoal. The remaining sites contain type E or F material which is thought to be pre-Holocene fluvial sediment.

IV. SUMMARY AND RECOMMENDATIONS

Approximately 1800 square kilometers of the central New Jersey shoreface and Inner Continental Shelf was surveyed, using several seismic reflection devices and a total of 97 vibratory cores to locate and quantify sand resources suitable for use as fill in nourishing recreation beaches on the adjacent barrier islands. Study results show that a large number of linear and arcuate shoals are present which contain large volumes of clean quartz sand. Most of the shoals appear to be Holocene to modern in age and to overlie a substrate of pre-Holocene sedimentary deposits which are fluvial in origin and exhibit characteristics of past subaerial erosion. It is estimated that about 172 million cubic meters of suitable sand from 15 potential borrow sites is present. In addition, 10 other sites were found to contain suitable material, but there are insufficient data on these sites to project the deposit beyond the core site or to estimate volumes available. Additional data are required to evaluate these sites.

A very important consideration that was not addressed in this report is the possible adverse effects of removing sand by dredging from shoreface

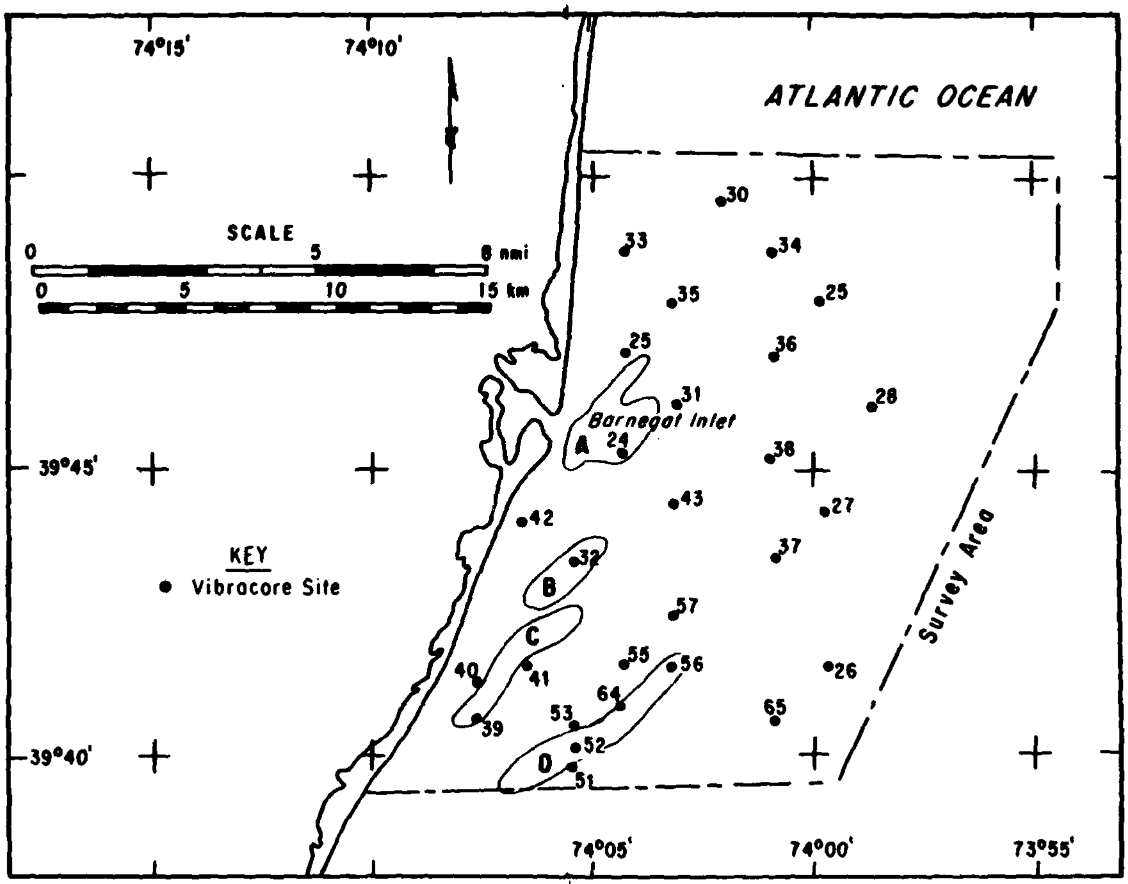


Figure 8. Map of the Barnegat Inlet shelf area showing shoal areas having the highest potential for sand suitable for beach nourishment. Sites A to D are described in Table 3.

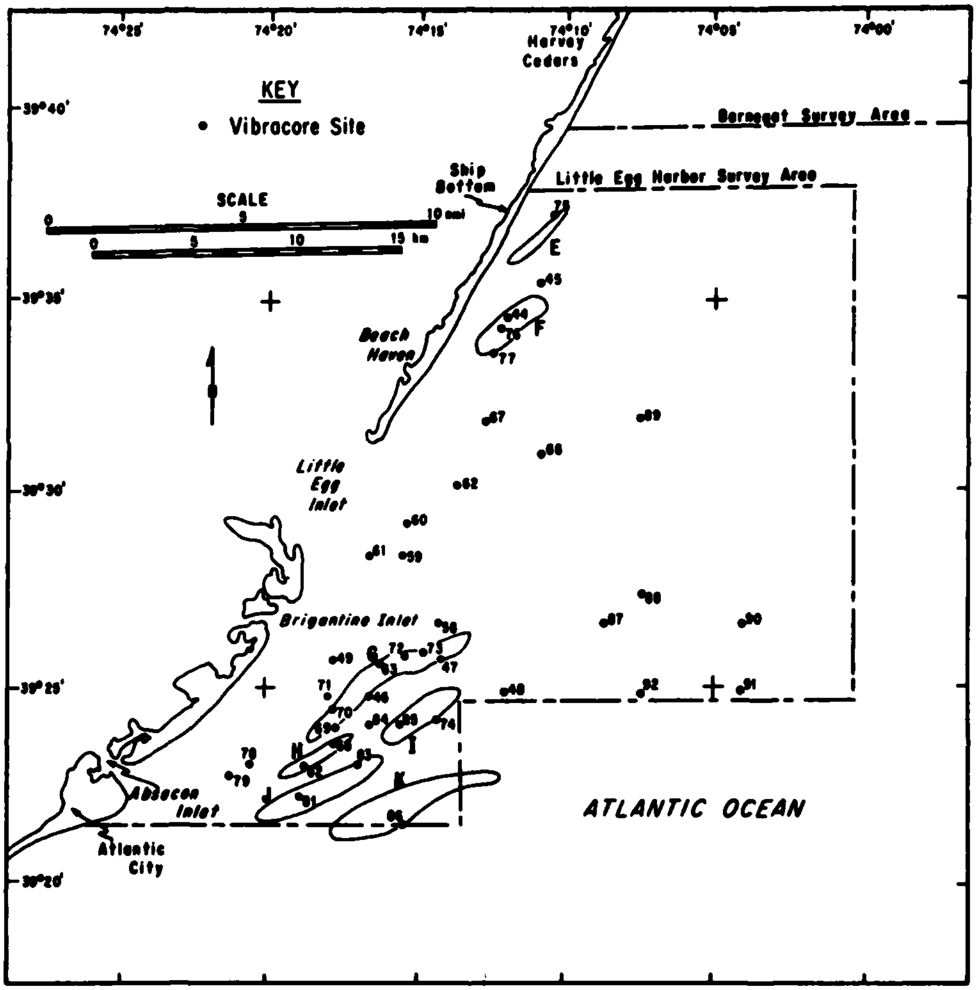


Figure 9. Map of the Little Egg Inlet shelf area showing shoal areas having the highest potential for sand suitable for beach nourishment. Sites E to K are described in Table 3.

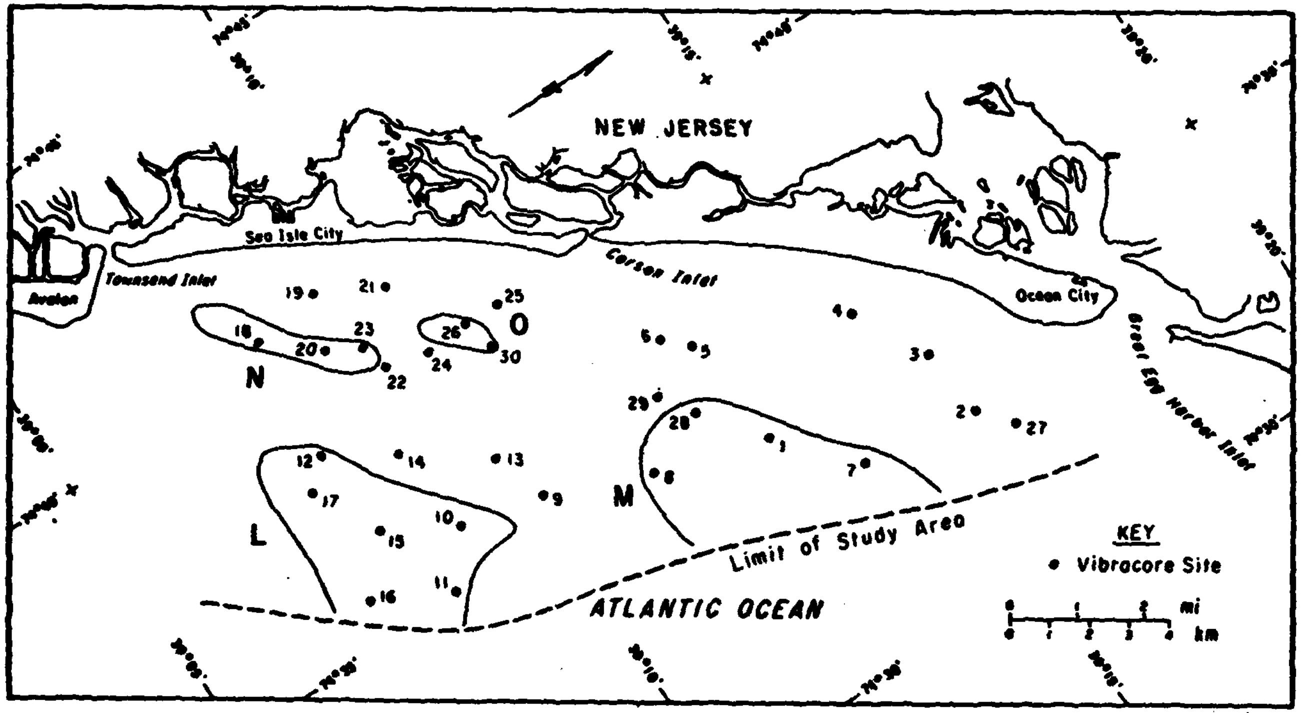


Figure 10. Map of the Ocean City to Avalon shelf area showing shoal areas having the highest potential for sand suitable for beach nourishment. Sites L to O are described in Table 3.

Table 3. Potential borrow areas.

Designation	Water depth (m)	Core No.	Grain size			Area ($\times 10^6$ m^2)	Thickness (m)		Estimated volume ($\times 10^6$ m^3)	Type deposit
			Mean diameter (mm)	Mean diameter (phi)	Standard deviation		Max.	Avg.		
A	2 to 9	24	0.24 to 0.51	2.0 to 1.0	0.46 to 1.05	4.87	3.0	1.5	11.14	Inlet shoal
B	9 to 13	32	0.35 to 0.38	1.5 to 1.4	0.72 to 0.91	2.76	3.0	1.2	5.90	Linear shoal
C	9 to 13	41,55	0.24 to 0.36	2.1 to 1.5	0.57 to 1.02	3.97	3.0	1.5	12.72	Linear shoal
D	9 to 13	51,52,56,64	0.33 to 0.52	1.6 to 1.0	0.58 to 0.94	5.96	7.6	1.8	25.18	Linear shoal
E	6 to 9	75	0.11 to 0.49	3.1 to 1.0	0.53 to 0.11	1.67	4.6	1.8	4.44	Linear shoal
F	7 to 11	44,76,77	0.28 to 0.52	1.9 to 1.0	0.46 to 0.83	4.30	3.7	1.5	8.38	Linear shoal
G	7 to 11	46,47,63,68, 69,70,72,73	0.19 to 0.49	2.4 to 1.0	0.49 to 0.72	8.34	6.1	1.8	28.50	Linear shoal
H	9 to 11	82	0.20 to 0.49	2.3 to 1.2	0.73 to 1.08	1.46	4.6	2.1	4.54	Linear shoal
I	9 to 13	74,85	0.18 to 0.57	2.5 to 0.8	0.52 to 0.78	4.07	5.5	1.8	14.92	Linear shoal
J	9 to 15	81,83	0.27 to 0.39	1.9 to 1.4	0.73 to 0.79	6.03	4.6	1.5	14.70	Linear shoal
K	15 to 16	86	0.39 to 0.50	1.4 to 1.0	0.70 to 0.87	9.36	6.1	1.8	27.84	Linear shoal
L	9 to 15	10,11,12,15, 16,17	Grain-size analysis not available but areas L to O contain clean, medium- to coarse-grain sand.			2.41	3.6	2.4	5.86	Linear shoal
M	9 to 16	1,7,8,28				2.34	4.8	2.5	5.94	Linear shoal
N	9 to 11	18,20,23				0.49	3.0	2.7	1.32	Linear shoal
O	9 to 11	26,30				0.24	3.0	2.3	0.56	Linear shoal

Table 4. Cores from the Ocean City to Avalon survey.

Core No.	Water depth (m)	Core length (m)	Overburden thickness (m)	Medium-coarse sand thickness (m)	Core location
1	12.2	3.4	0	1.1	Linear shoal
2	11	5.9	0.7	0.2	Shoreface
3	8.5	4.5	—	0	Shoreface
4	7.9	6.1	—	0	Shoreface
5	9.8	3.0	—	0	Shoreface
6	11.6	4.2	0.8	3.4	Shoreface
7	16.5	2.4	0.1	2.3	Intershoal swale
8	14	4.8	0	4.8	Intershoal swale
9	13.7	4.3	—	0	Intershoal swale
10	11.9	3.4	0	1.5	Linear shoal
11	15.2	4.2	0	3.1	Intershoal swale
12	14.6	3.6	0	3.6	Intershoal swale
13	12.8	4.5	—	0	Linear shoal
14	13.7	5.0	2.1	2.9	Intershoal swale
15	10.4	2.2	0	1.1	Linear shoal swale
16	8.5	2.9	0	2.9	Linear shoal swale
17	9.1	2.4	0	2.4	Linear shoal swale
18	8.5	5.0	0	2.1	Linear shoal swale
19	7.3	4.8	—	0	Linear shoal swale
20	9.1	6.0	0	2.9	Linear shoal swale
21	6.7	5.2	—	0	Linear shoal swale
22	9.8	4.6	—	0	Linear shoal swale
23	10.7	3.0	0	3.0	Linear shoal swale
24	9.5	3.5	—	0	Linear shoal swale
25	7.3	5.0	—	0	Shoreface
26	10.7	5.9	0	3.0	Shoreface
27	10.1	5.7	—	0	Shoreface
28	8.5	2.0	0	2.0	Linear shoal
29	10.4	4.4	—	0	Linear shoal
30	9.1	4.4	0	1.5	Linear shoal

Table 5. Promising core sites.

Core No.	Water depth (m)	Mean diameter		Grain size standard deviation
		(mm)	(phi)	
25	9.8	0.36 to 0.69	1.5 to 0.5	0.28 to 0.49
30	17.1	0.61 to 0.85	0.7 to 0.3	0.66 to 1.23
33	9.8	0.36 to 0.62	1.5 to 0.7	0.41 to 0.77
34	18.3	0.20 to 0.46	2.3 to 1.1	0.59 to 1.38
39	7.9	0.29 to 0.39	1.8 to 1.4	0.43 to 0.64
45	14.6	0.55 to 0.61	0.9 to 0.7	0.62 to 0.69
48	19.2	0.32 to 0.48	1.6 to 1.1	0.[illegible]3 to 0.81
65	21.3	0.20 to 0.38	2.3 to 1.4	0.52 to 1.21
87	18.6	0.42 to 0.47	1.2 to 1.1	0.56 to 0.88
88	19.2	0.39 to 0.54	1.4 to 0.9	0.52 to 0.73

areas or from the nearshore shoals. Various studies have shown that the shoreface to some seaward "close-out" depth is in dynamic equilibrium with the shore (e.g., Hallermeier, 1981[5]). If sand were dredged from within this zone it may cause sand to move seaward from the beach and aggravate coastal erosion. The shoals present within the study area, even out to depths of -20 meters, appear to be acted upon by modern coastal processes, and modification or removal of the shoals by dredging could affect wave energy levels on the adjacent coast as well as the coastal sediment budget. These subjects should be studied in detail before initiation of any sand removal by dredging.

[5]HALLERMEIER, R.J., "Seaward Limit of Significant Sand Transport by Waves: An Annual Zonation for Seasonal Profiles," CETA 81-2, U.S. Army, Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., Jan. 1981.

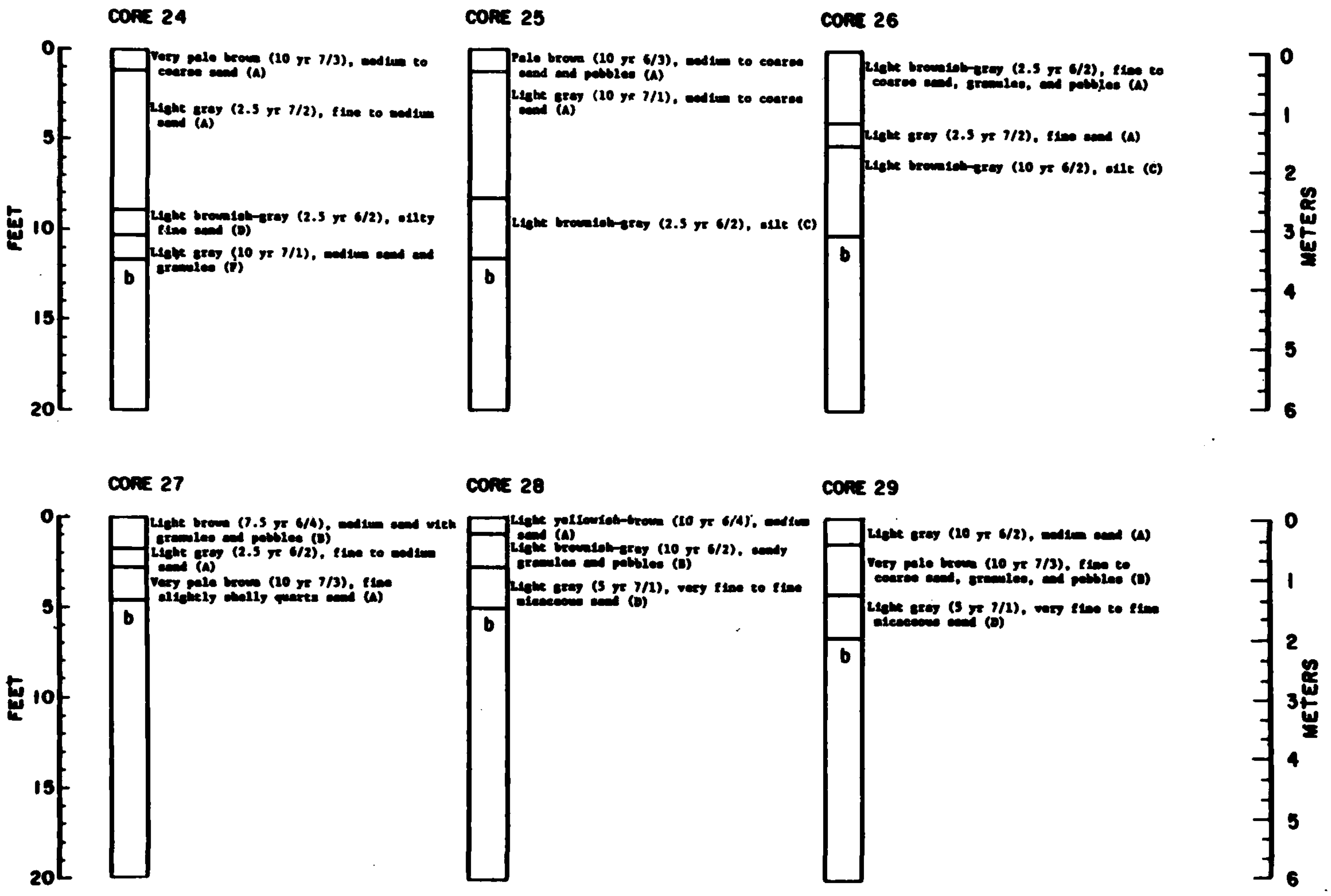
APPENDIX A

CORE SEDIMENT DESCRIPTIONS

This appendix contains sediment descriptions from cores in the Barnegat and Little Egg Inlets region. They are based on both megascopic and microscopic examination from sampling locations shown in Figures 2, 3, and 4. Sediment color is based on dry samples. The letter "b" denotes the bottom of the core.

Sediment names are based on the following Wentworth classifications (see Table 1).

Sediment	Size (mm)	Size (phi)
Gravel	>2	<-1
Very coarse sand	1.0 to 2.0	0 to -1
Coarse sand	0.5 to 1.0	1 to 0-
Medium sand	0.25 to 0.5	2 to 1-
Fine sand	0.125 to 0.25	3 to 2-
Very fine sand	0.0625 to 0.125	4 to 3-
Silt and mud	<0.0625	>4
Sorting terms		
Very well sorted		0.35
Well sorted		0.50
Moderately well sorted		0.80
Moderately sorted		1.40
Poorly sorted		2.00
Very poorly sorted		2.60
Extremely poorly sorted		


CORE 24
Very pale brown (10 yr 7/3), medium to coarse sand (A)
Light gray (2.5 yr 7/2), fine to medium sand (A)
Light brownish-gray (2.5 yr 6/2), silty fine sand (B)
Light gray (10 yr 7/1), medium sand and granules (F)
CORE 25
Pale brown (10 yr 6/3), medium to coarse sand and pebbles (A)
Light gray (10 yr 7/1), medium to coarse sand (A)
Light brownish-gray (2.5 yr 6/2), silt (C)
CORE 26
Light brownish-gray (2.5 yr 6/2), fine to coarse sand, granules, and pebbles (A)
Light gray (2.5 yr 7/2), fine sand (A)
Light brownish-gray (10 yr 6/2), silt (C)
CORE 27
Light brown (7.5 yr 6/4), medium sand with granules and pebbles (B)
Light gray (2.5 yr 6/2), fine to medium sand (A)
Very pale brown (10 yr 7/3), fine slightly shelly quartz sand (A)
CORE 28
Light yellowish-brown (10 yr 6/4), medium sand (A)
Light brownish-gray (10 yr 6/2), sandy granules and pebbles (B)
Light gray (5 yr 7/1), very fine to fine micaceous sand (B)
CORE 29
Light gray (10 yr 6/2), medium sand (A)
Very pale brown (10 yr 7/3), fine to coarse sand, granules, and pebbles (B)
Light gray (5 yr 7/1), very fine to fine micaceous sand (B)
b
FEET
0
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10
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20
METERS
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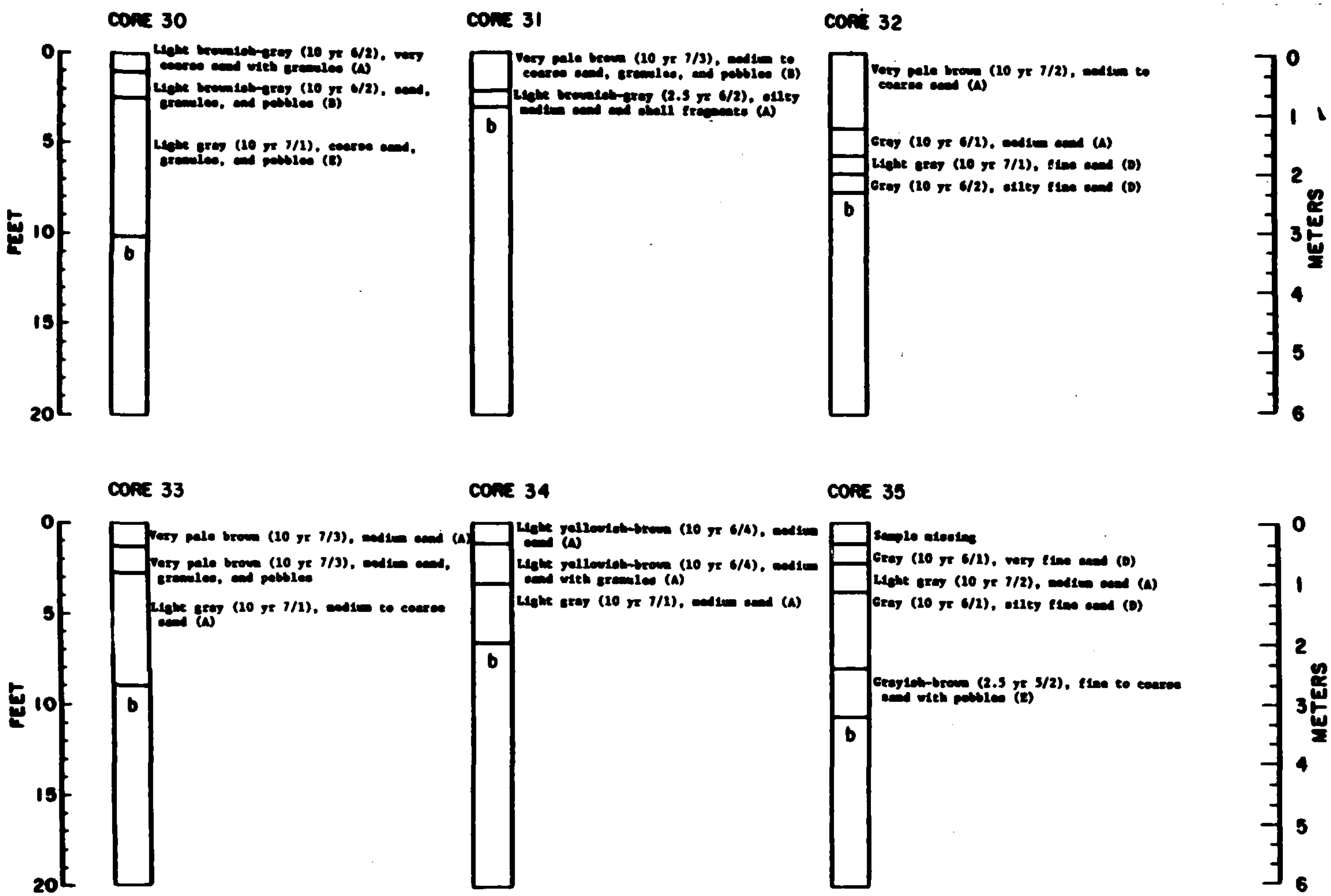

CORE 30
Light brownish-gray (10 yr 6/2), very coarse sand with granules (A)
Light brownish-gray (10 yr 6/2), sand, granules, and pebbles (B)
Light gray (10 yr 7/1), coarse sand, granules, and pebbles (E)
b
CORE 31
Very pale brown (10 yr 7/3), medium to coarse sand, granules, and pebbles (B)
Light brownish-gray (2.5 yr 6/2), silty medium sand and shell fragments (A)
b
CORE 32
Very pale brown (10 yr 7/2), medium to coarse sand (A)
Gray (10 yr 6/1), medium sand (A)
Light gray (10 yr 7/1), fine sand (D)
Gray (10 yr 6/2), silty fine sand (D)
b
CORE 33
Very pale brown (10 yr 7/3), medium sand (A)
Very pale brown (10 yr 7/3), medium sand, granules, and pebbles
Light gray (10 yr 7/1), medium to coarse sand (A)
b
CORE 34
Light yellowish-brown (10 yr 6/4), medium sand (A)
Light yellowish-brown (10 yr 6/4), medium sand with granules (A)
Light gray (10 yr 7/1), medium sand (A)
b
CORE 35
Sample missing
Gray (10 yr 6/1), very fine sand (D)
Light gray (10 yr 7/2), medium sand (A)
Gray (10 yr 6/1), silty fine sand (D)
Grayish-brown (2.5 yr 5/2), fine to coarse sand with pebbles (E)
b
FEET
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20
METERS
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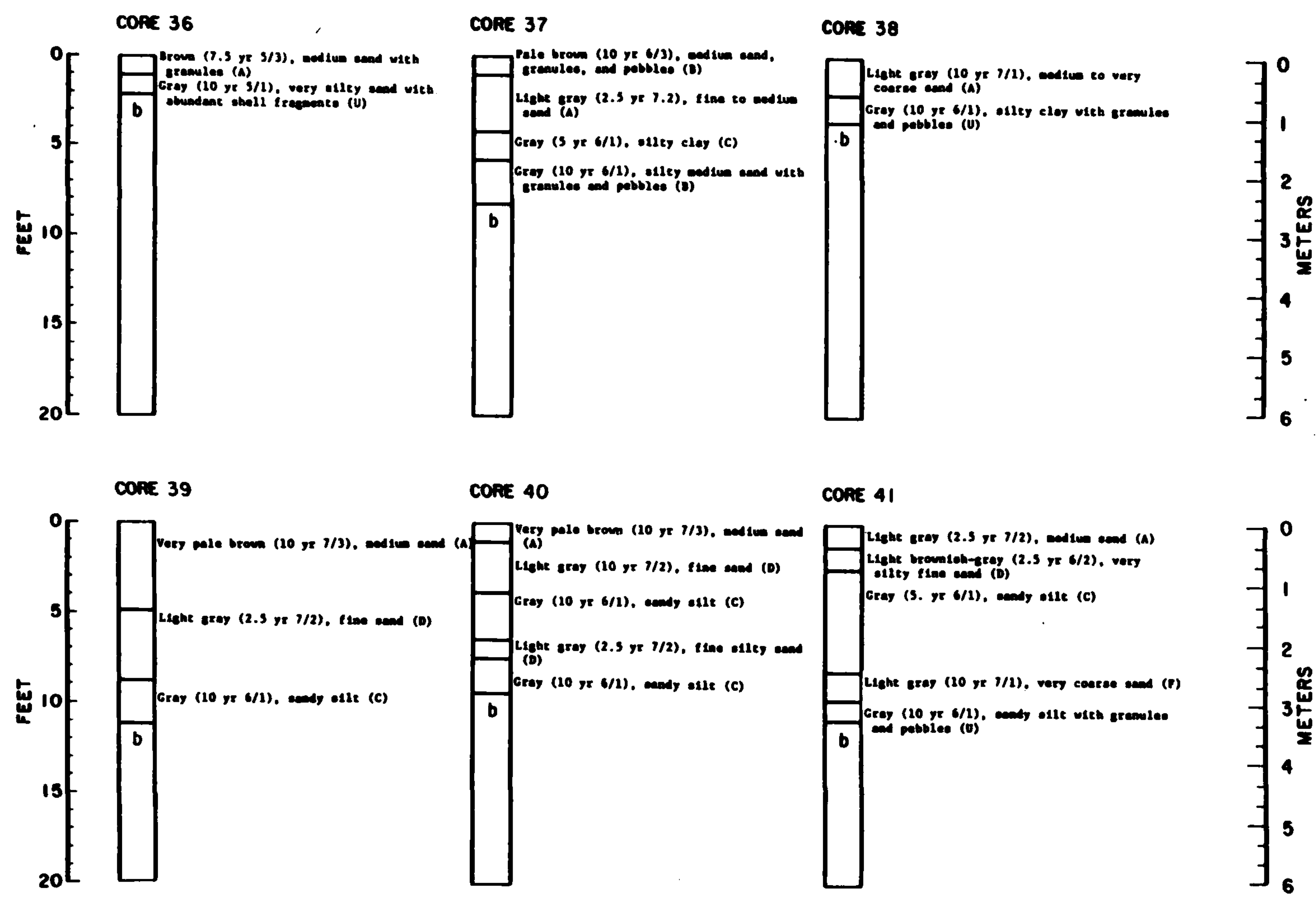
CORE 36
Brown (7.5 yr 5/3), medium sand with granules (A)
Gray (10 yr 5/1), very silty sand with abundant shell fragments (U)
b
CORE 37
Pale brown (10 yr 6/3), medium sand, granules, and pebbles (B)
Light gray (2.5 yr 7.2), fine to medium sand (A)
Gray (5 yr 6/1), silty clay (C)
Gray (10 yr 6/1), silty medium sand with granules and pebbles (B)
b
CORE 38
Light gray (10 yr 7/1), medium to very coarse sand (A)
Gray (10 yr 6/1), silty clay with granules and pebbles (U)
b
CORE 39
Very pale brown (10 yr 7/3), medium sand (A)
Light gray (2.5 yr 7/2), fine sand (D)
Gray (10 yr 6/1), sandy silt (C)
b
CORE 40
Very pale brown (10 yr 7/3), medium sand (A)
Light gray (10 yr 7/2), fine sand (D)
Gray (10 yr 6/1), sandy silt (C)
Light gray (2.5 yr 7/2), fine silty sand (D)
Gray (10 yr 6/1), sandy silt (C)
b
CORE 41
Light gray (2.5 yr 7/2), medium sand (A)
Light brownish-gray (2.5 yr 6/2), very silty fine sand (D)
Gray (5. yr 6/1), sandy silt (C)
Light gray (10 yr 7/1), very coarse sand (F)
Gray (10 yr 6/1), sandy silt with granules and pebbles (U)
b
FEET
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METERS
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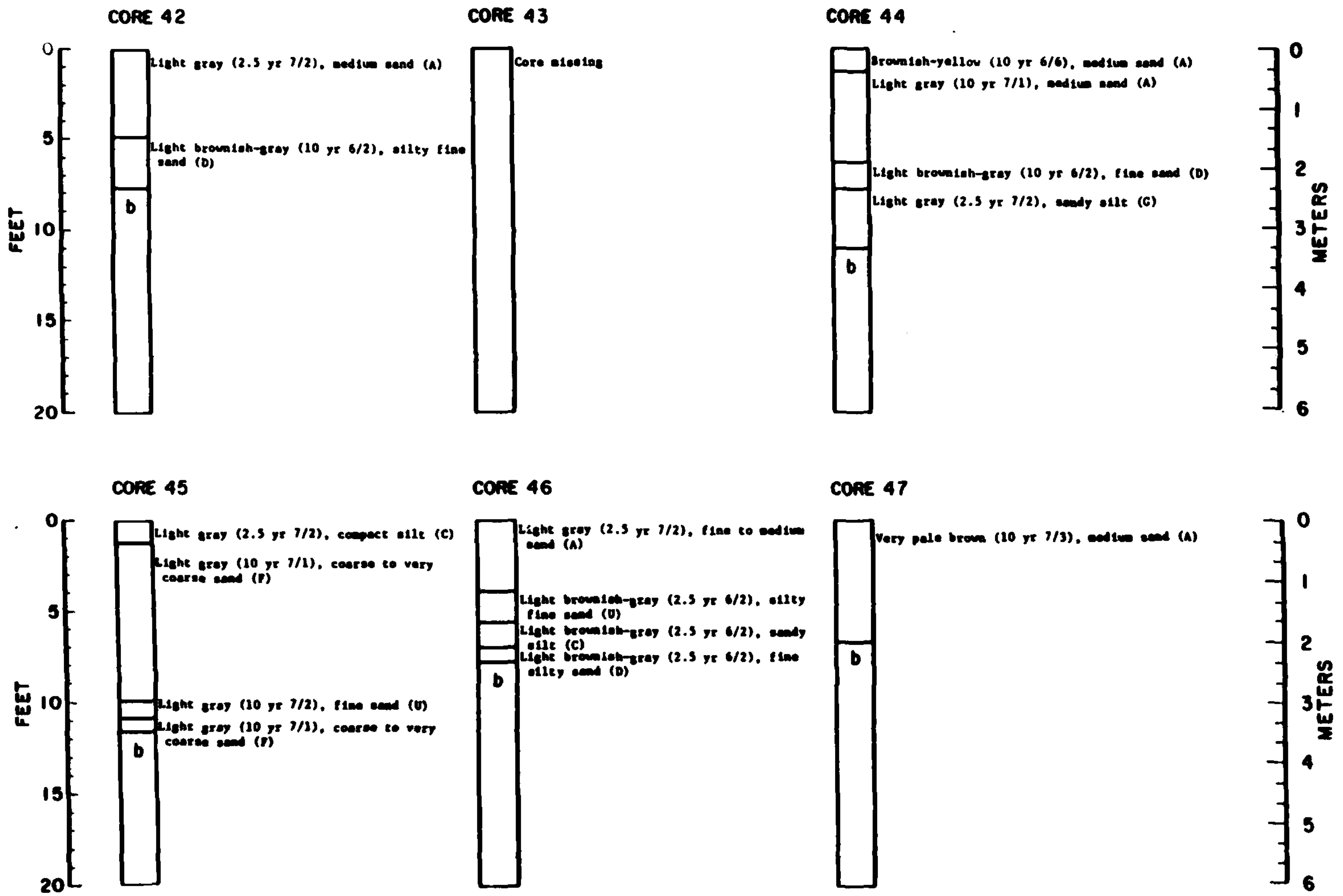
CORE 42
Light gray (2.5 yr 7/2), medium sand (A)
Light brownish-gray (10 yr 6/2), silty fine sand (D)
b
CORE 43
Core missing
CORE 44
Brownish-yellow (10 yr 6/6), medium sand (A)
Light gray (10 yr 7/1), medium sand (A)
Light brownish-gray (10 yr 6/2), fine sand (D)
Light gray (2.5 yr 7/2), sandy silt (G)
b
CORE 45
Light gray (2.5 yr 7/2), compact silt (C)
Light gray (10 yr 7/1), coarse to very coarse sand (F)
Light gray (10 yr 7/2), fine sand (U)
Light gray (10 yr 7/3), coarse to very coarse sand (F)
b
CORE 46
Light gray (2.5 yr 7/2), fine to medium sand (A)
Light brownish-gray (2.5 yr 6/2), silty fine sand (U)
Light brownish-gray (2.5 yr 6/2), sandy silt (C)
Light brownish-gray (2.5 yr 6/2), fine silty sand (D)
b
CORE 47
Very pale brown (10 yr 7/3), medium sand (A)
b
FEET
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METERS
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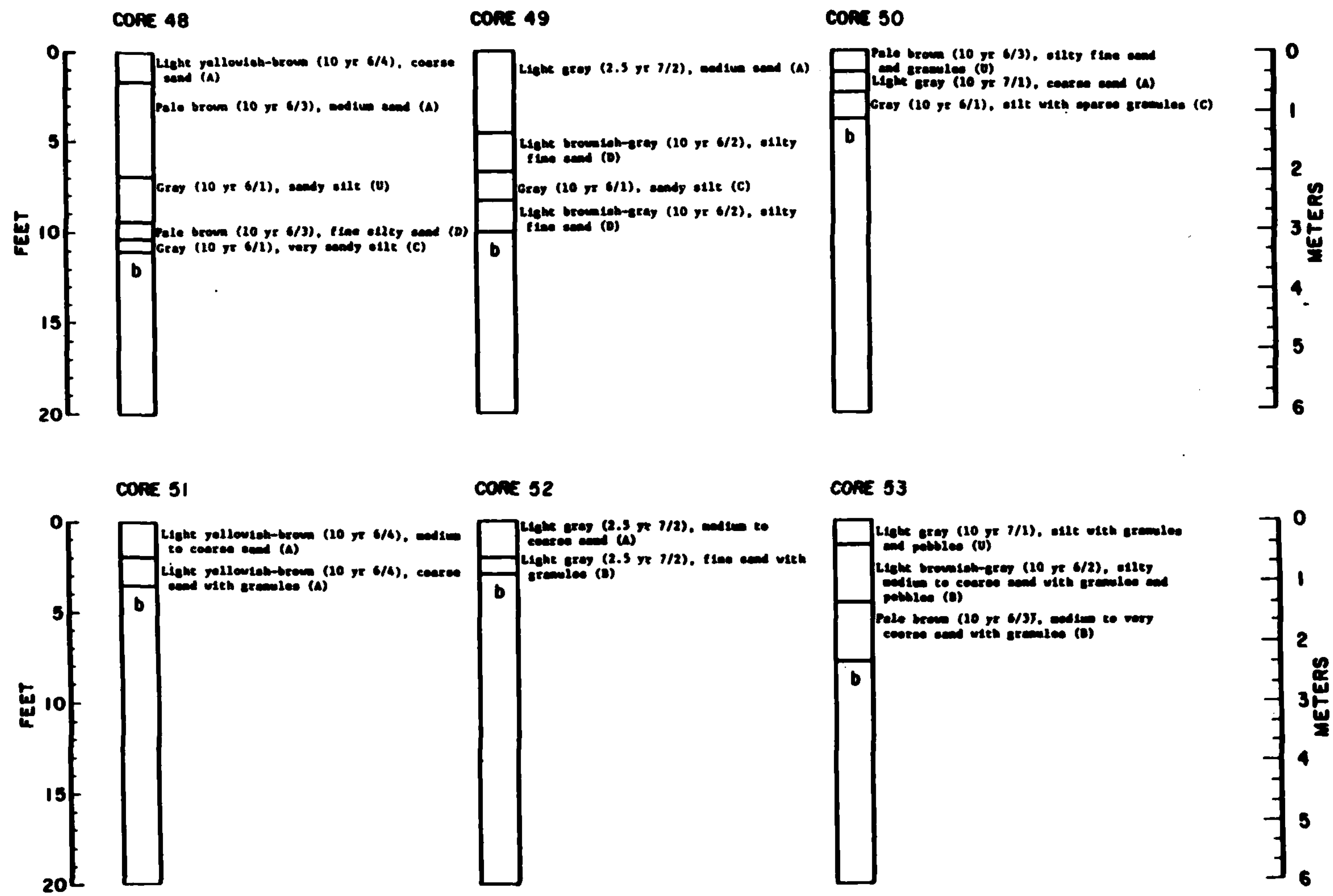
CORE 48
Light yellowish-brown (10 yr 6/4), coarse sand (A)
Pale brown (10 yr 6/3), medium sand (A)
Gray (10 yr 6/1), sandy silt (U)
Pale brown (10 yr 6/3), fine silty sand (D)
Gray (10 yr 6/1), very sandy silt (C)
b
CORE 49
Light gray (2.5 yr 7/2), medium sand (A)
Light brownish-gray (10 yr 6/2), silty fine sand (D)
Gray (10 yr 6/1), sandy silt (C)
Light brownish-gray (10 yr 6/2), silty fine sand (D)
b
CORE 50
Pale brown (10 yr 6/3), silty fine sand and granules (U)
Light gray (10 yr 7/1), coarse sand (A)
Gray (10 yr 6/1), silt with sparse granules (C)
b
CORE 51
Light yellowish-brown (10 yr 6/4), medium to coarse sand (A)
Light yellowish-brown (10 yr 6/4), coarse sand with granules (A)
b
CORE 52
Light gray (2.5 yr 7/2), medium to coarse sand (A)
Light gray (2.5 yr 7/2), fine sand with granules (B)
b
CORE 53
Light gray (10 yr 7/1), silt with granules and pebbles (U)
Light brownish-gray (10 yr 6/2), silty medium to coarse sand with granules and pebbles (B)
Pale brown (10 yr 6/3), medium to very coarse sand with granules (B)
b
FEET
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5
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METERS
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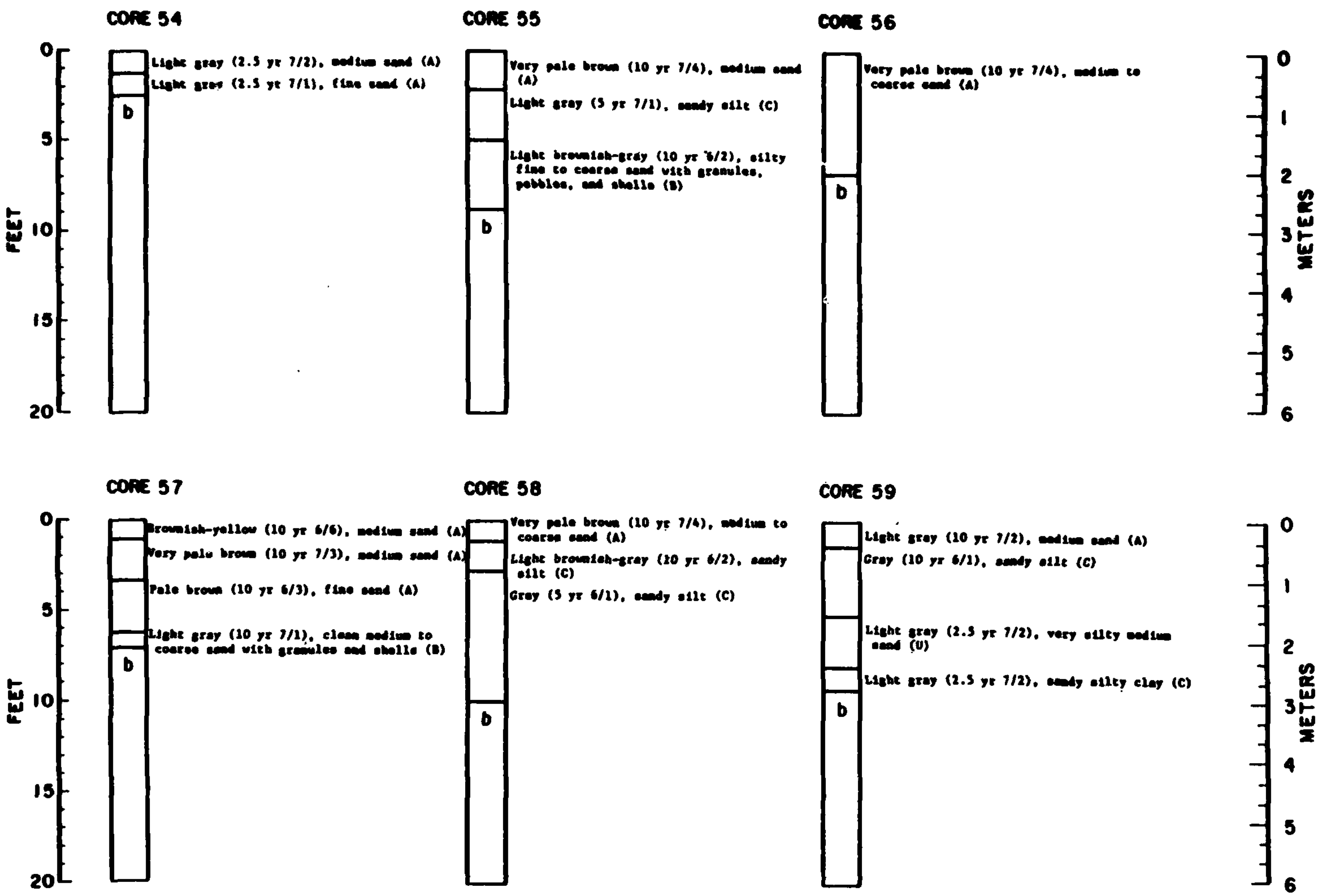
CORE 54
Light gray (2.5 yr 7/2), medium sand (A)
Light gray (2.5 yr 7/1), fine sand (A)
b
CORE 55
Very pale brown (10 yr 7/4), medium sand (A)
Light gray (5 yr 7/1), sandy silt (C)
Light brownish-gray (10 yr 6/2), silty fine to coarse sand with granules, pebbles, and shells (B)
b
CORE 56
Very pale brown (10 yr 7/4), medium to coarse sand (A)
b
CORE 57
Brownish-yellow (10 yr 6/6), medium sand (A)
Very pale brown (10 yr 7/3), medium sand (A)
Pale brown (10 yr 6/3), fine sand (A)
Light gray (10 yr 7/1), clean medium to coarse sand with granules and shells (B)
b
CORE 58
Very pale brown (10 yr 7/4), medium to coarse sand (A)
Light brownish-gray (10 yr 6/2), sandy silt (C)
Gray (5 yr 6/1), sandy silt (C)
b
CORE 59
Light gray (10 yr 7/2), medium sand (A)
Gray (10 yr 6/1), sandy silt (C)
Light gray (2.5 yr 7/2), very silty medium sand (U)
Light gray (2.5 yr 7/2), sandy silty clay (C)
b
FEET
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METERS
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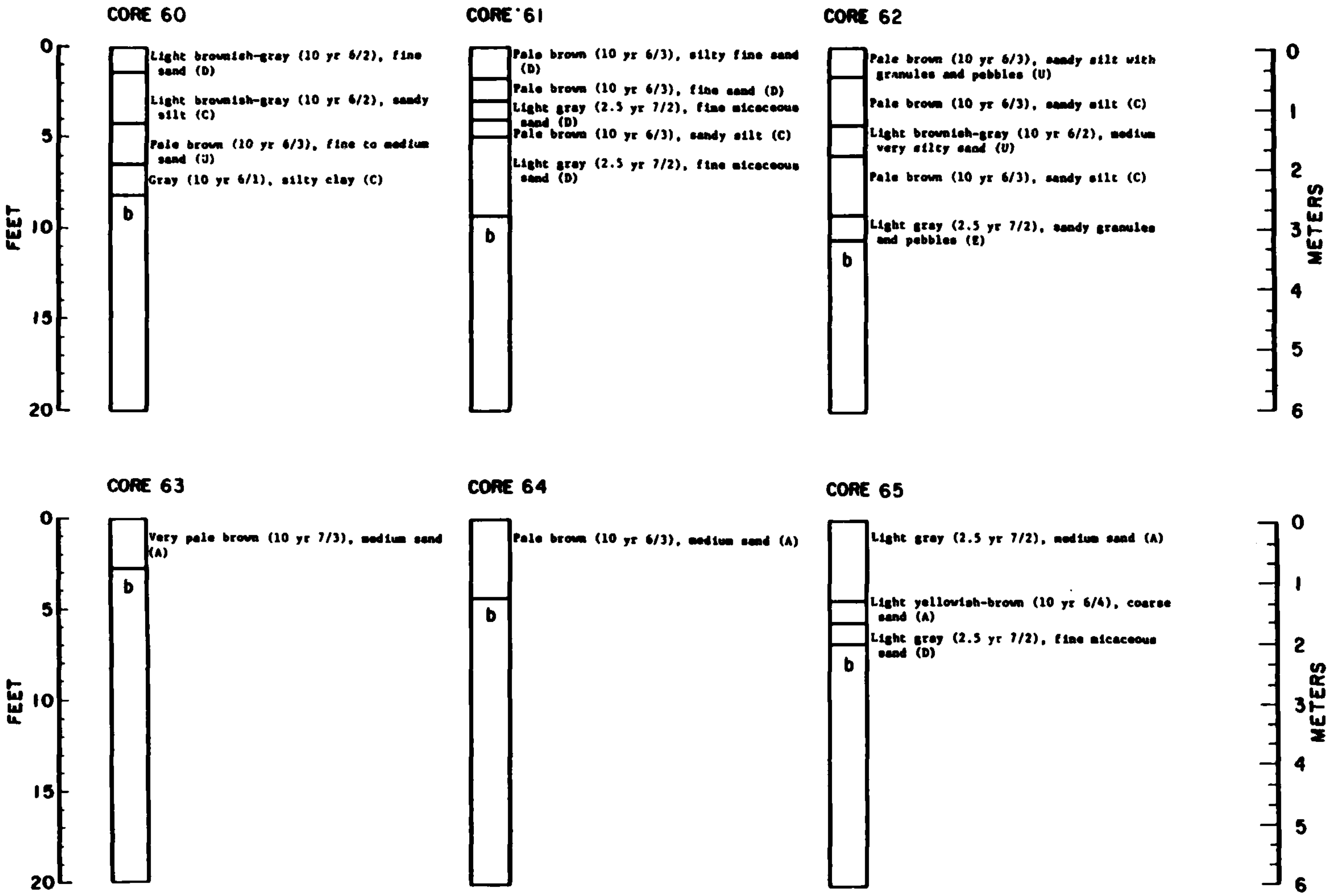
CORE 60
Light brownish-gray (10 yr 6/2), fine sand (D)
Light brownish-gray (10 yr 6/2), sandy silt (C)
Pale brown (10 yr 6/3), fine to medium sand (U)
Gray (10 yr 6/1), silty clay (C)
b
CORE 61
Pale brown (10 yr 6/3), silty fine sand (D)
Pale brown (10 yr 6/3), fine sand (D)
Light gray (2.5 yr 7/2), fine micaceous sand (D)
Pale brown (10 yr 6/3), sandy silt (C)
Light gray (2.5 yr 7/2), fine micaceous sand (D)
b
CORE 62
Pale brown (10 yr 6/3), sandy silt with granules and pebbles (U)
Pale brown (10 yr 6/3), sandy silt (C)
Light brownish-gray (10 yr 6/2), medium very silty sand (U)
Pale brown (10 yr 6/3), sandy silt (C)
Light gray (2.5 yr 7/2), sandy granules and pebbles (E)
b
CORE 63
Very pale brown (10 yr 7/3), medium sand (A)
b
CORE 64
Pale brown (10 yr 6/3), medium sand (A)
b
CORE 65
Light gray (2.5 yr 7/2), medium sand (A)
Light yellowish-brown (10 yr 6/4), coarse sand (A)
Light gray (2.5 yr 7/2), fine micaceous sand (D)
b
FEET
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5
10
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METERS
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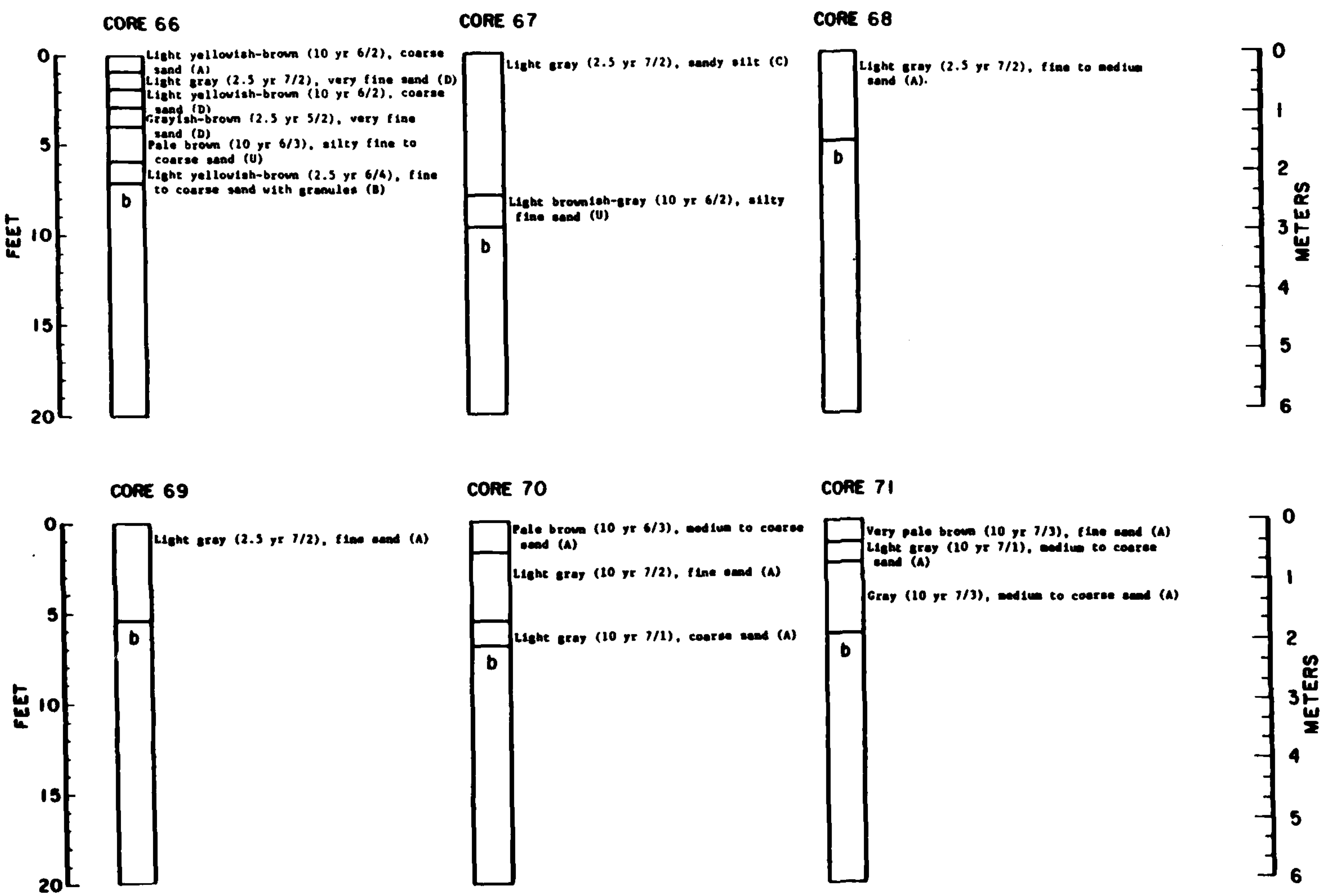
CORE 66
Light yellowish-brown (10 yr 6/2), coarse sand (A)
Light gray (2.5 yr 7/2), very fine sand (D)
Light yellowish-brown (10 yr 6/2), coarse sand (D)
Grayish-brown (2.5 yr 5/2), very fine sand (D)
Pale brown (10 yr 6/3), silty fine to coarse sand (U)
Light yellowish-brown (2.5 yr 6/4), fine to coarse sand with granules (B)
CORE 67
Light gray (2.5 yr 7/2), sandy silt (C)
Light brownish-gray (10 yr 6/2), silty fine sand (U)
CORE 68
Light gray (2.5 yr 7/2), fine to medium sand (A).
CORE 69
Light gray (2.5 yr 7/2), fine sand (A)
CORE 70
Pale brown (10 yr 6/3), medium to coarse sand (A)
Light gray (10 yr 7/2), fine sand (A)
Light gray (10 yr 7/1), coarse sand (A)
CORE 71
Very pale brown (10 yr 7/3), fine sand (A)
Light gray (10 yr 7/1), medium to coarse sand (A)
Gray (10 yr 7/3), medium to coarse sand (A)
b
FEET
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METERS
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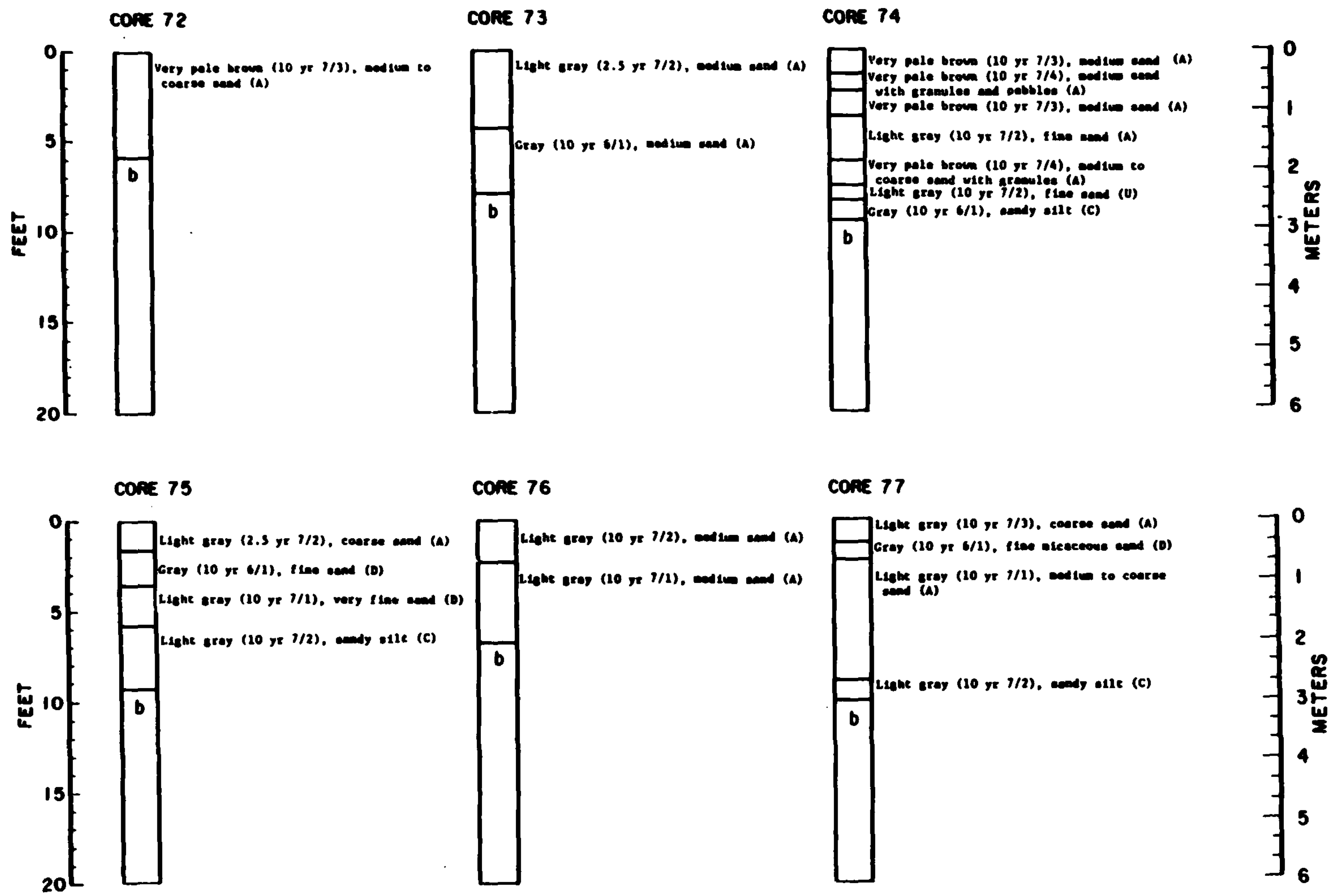
CORE 72
CORE 73
CORE 74
CORE 75
CORE 76
CORE 77
FEET
0
5
10
15
20
METERS
0
1
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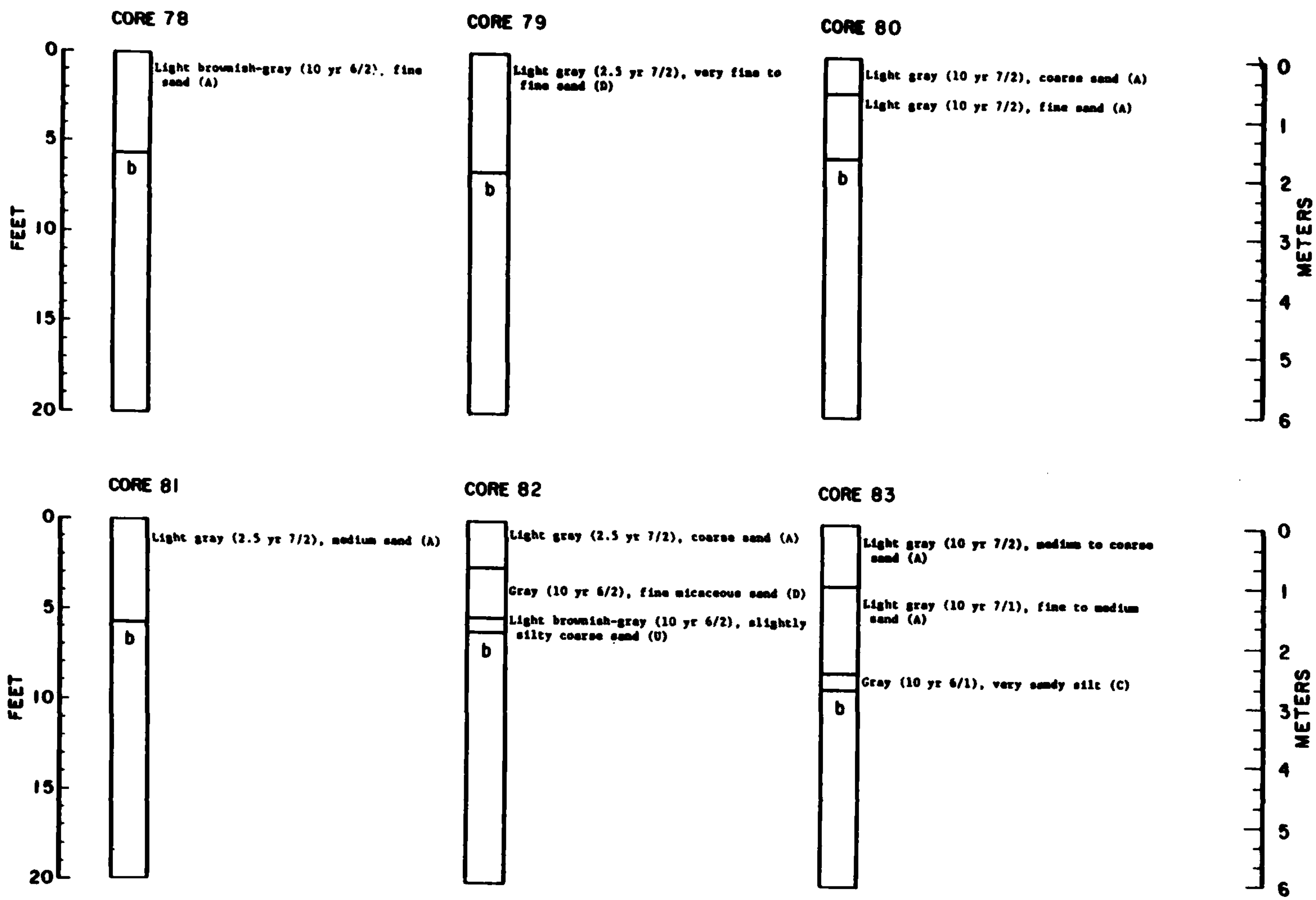
4
5
6
Very pale brown (10 yr 7/3), medium to coarse sand (A)
b
Light gray (2.5 yr 7/2), medium sand (A)
Gray (10 yr 6/1), medium sand (A)
Very pale brown (10 yr 7/3), medium sand (A)
Very pale brown (10 yr 7/4), medium sand with granules and pebbles (A)
Very pale brown (10 yr 7/3), medium sand (A)
Light gray (10 yr 7/2), fine sand (A)
Very pale brown (10 yr 7/4), medium to coarse sand with granules (A)
Light gray (10 yr 7/2), fine sand (U)
Gray (10 yr 6/1), sandy silt (C)
Light gray (2.5 yr 7/2), coarse sand (A)
Gray (10 yr 6/1), fine sand (D)
Light gray (10 yr 7/1), very fine sand (D)
Light gray (10 yr 7/2), sandy silt (C)
Light gray (10 yr 7/2), medium sand (A)
Light gray (10 yr 7/1), medium sand (A)
Light gray (10 yr 7/3), coarse sand (A)
Gray (10 yr 6/1), fine micaceous sand (D)
Light gray (10 yr 7/1), medium to coarse sand (A)
Light gray (10 yr 7/2), sandy silt (C)


CORE 78
Light brownish-gray (10 yr 6/2), fine sand (A)
b
CORE 79
Light gray (2.5 yr 7/2), very fine to fine sand (D)
b
CORE 80
Light gray (10 yr 7/2), coarse sand (A)
Light gray (10 yr 7/2), fine sand (A)
b
CORE 81
Light gray (2.5 yr 7/2), medium sand (A)
b
CORE 82
Light gray (2.5 yr 7/2), coarse sand (A)
Gray (10 yr 6/2), fine micaceous sand (D)
Light brownish-gray (10 yr 6/2), slightly silty coarse sand (D)
b
CORE 83
Light gray (10 yr 7/2), medium to coarse sand (A)
Light gray (10 yr 7/1), fine to medium sand (A)
Gray (10 yr 6/1), very sandy silt (C)
b
FEET
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METERS
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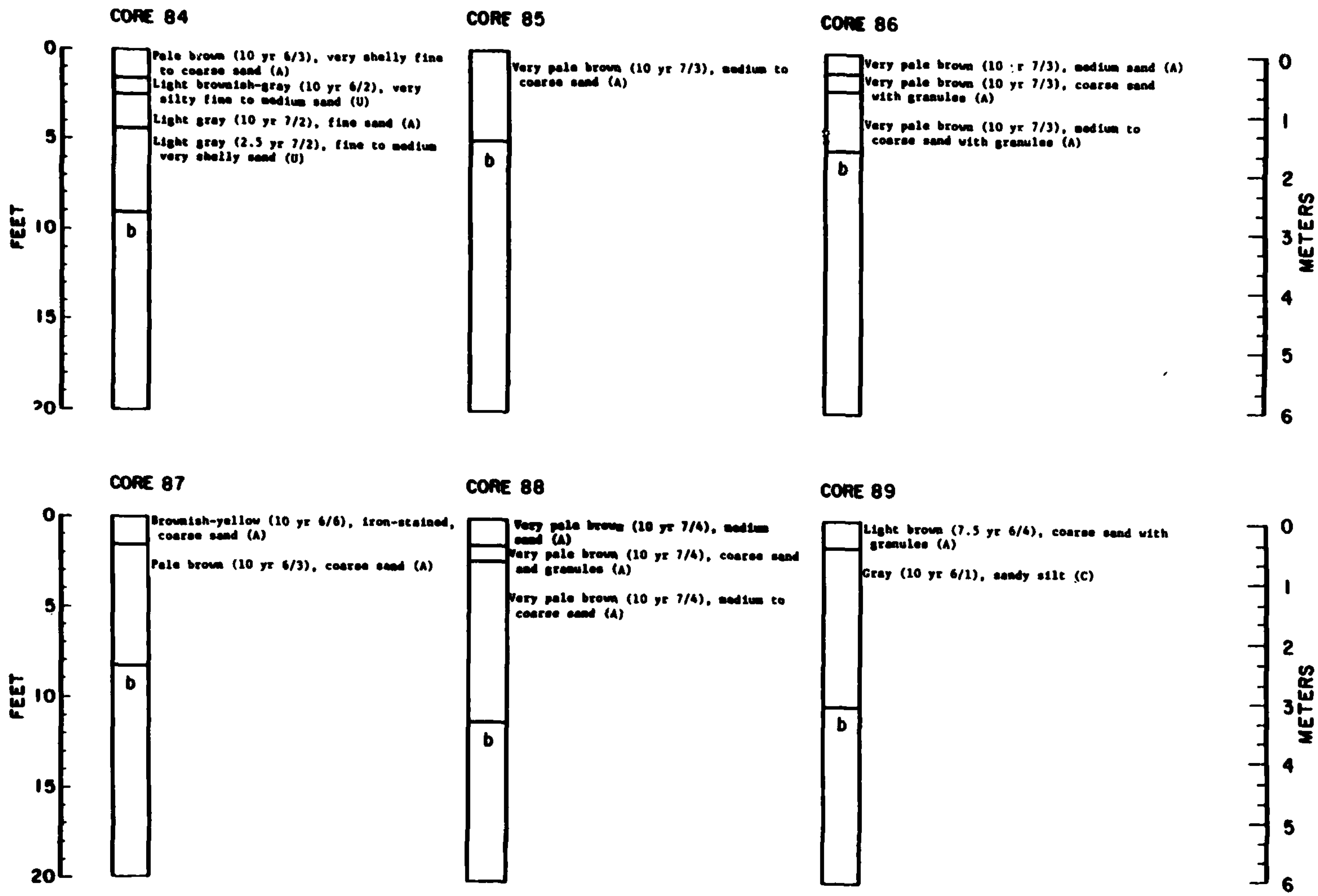
CORE 84
Pale brown (10 yr 6/3), very shelly fine to coarse sand (A)
Light brownish-gray (10 yr 6/2), very silty fine to medium sand (U)
Light gray (10 yr 7/2), fine sand (A)
Light gray (2.5 yr 7/2), fine to medium very shelly sand (U)
b
CORE 85
Very pale brown (10 yr 7/3), medium to coarse sand (A)
b
CORE 86
Very pale brown (10 yr 7/3), medium sand (A)
Very pale brown (10 yr 7/3), coarse sand with granules (A)
Very pale brown (10 yr 7/3), medium to coarse sand with granules (A)
b
CORE 87
Brownish-yellow (10 yr 6/6), iron-stained, coarse sand (A)
Pale brown (10 yr 6/3), coarse sand (A)
b
CORE 88
Very pale brown (10 yr 7/4), medium sand (A)
Very pale brown (10 yr 7/4), coarse sand and granules (A)
Very pale brown (10 yr 7/4), medium to coarse sand (A)
b
CORE 89
Light brown (7.5 yr 6/4), coarse sand with granules (A)
Gray (10 yr 6/1), sandy silt (C)
b
FEET
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METERS
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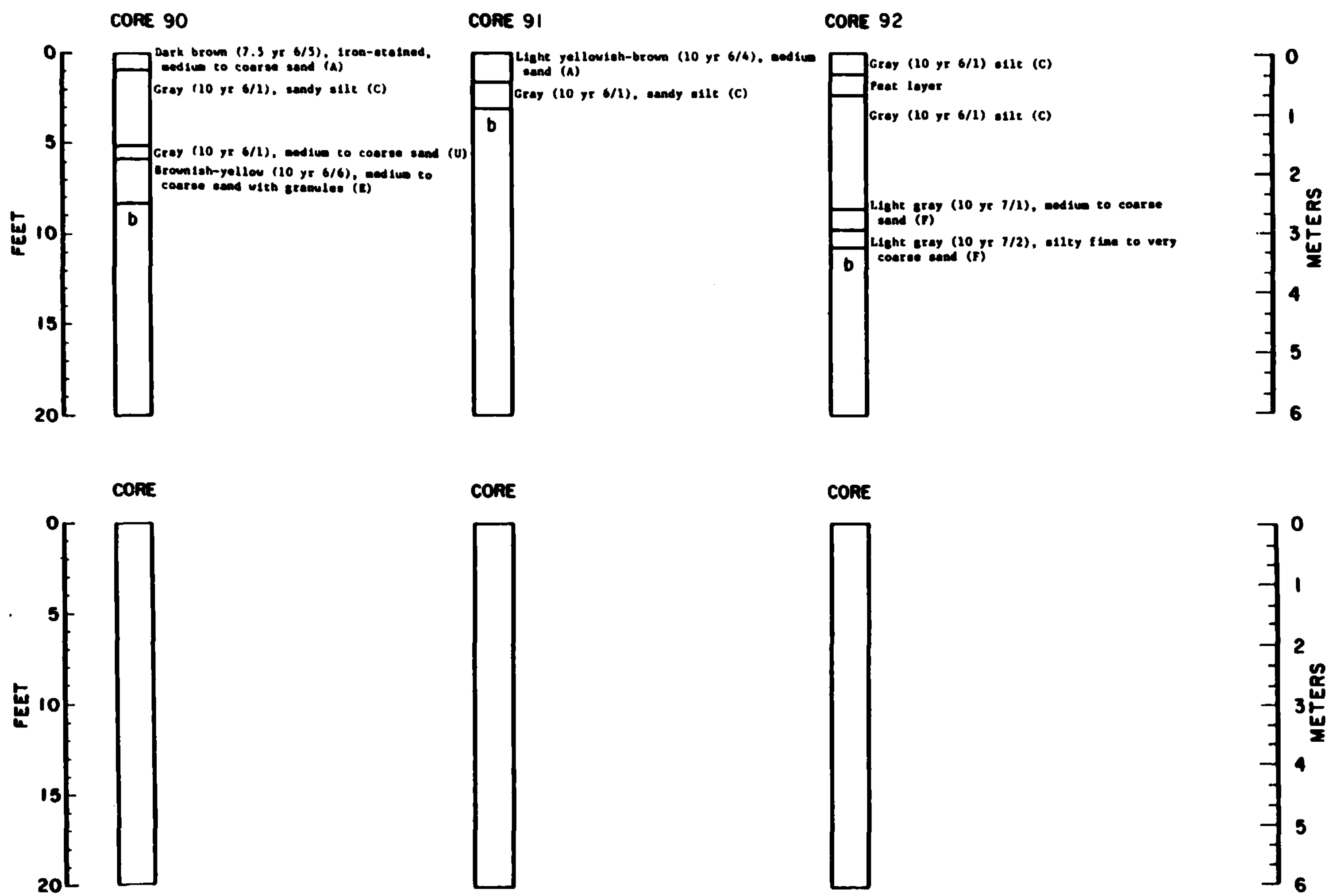
CORE 90
Dark brown (7.5 yr 6/5), iron-stained, medium to coarse sand (A)
Gray (10 yr 6/1), sandy silt (C)
Gray (10 yr 6/1), medium to coarse sand (U)
Brownish-yellow (10 yr 6/6), medium to coarse sand with granules (E)
b
CORE 91
Light yellowish-brown (10 yr 6/4), medium sand (A)
Gray (10 yr 6/1), sandy silt (C)
b
CORE 92
Gray (10 yr 6/1) silt (C)
Peat layer
Gray (10 yr 6/1) silt (C)
Light gray (10 yr 7/1), medium to coarse sand (F)
Light gray (10 yr 7/2), silty fine to very coarse sand (F)
b
FEET
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CORE
CORE

APPENDIX B

GRANULOMETRIC DATA AND CUMULATIVE CURVE PLOTS

This appendix contains the results of CERC's Rapid Sediment Analyzer (RSA) size analyses of 180 sediment samples from 64 cores in the study area (see Figs. 2, 3, and 4). Analyses are based on sand-size fractions only.

The samples are identified by core number and sample interval below the top of the core. Specific locations of the samples from each core are given in Appendix A.

Experience has shown that grain-size values from RSA analyses are consistent and slightly coarser than results of dry sieve analyses of identical samples. To relate these RSA data to other sieve data, empirical relations for converting RSA means and standard deviation to sieve analyses equivalents have been determined. The relationships, developed from RSA and sieve analyses at a 0.25-phi interval, are:

$$\text{mean: } \bar{X}_{\phi \text{sieve}} = 1.0735\ \bar{X}_{\phi \text{RSA}} + 0.1876$$

RSA standard deviation values may be converted to sieve sorting equivalents by the formula:

$$\text{standard deviation: } \sigma_{\phi}\ \text{sieve} = 1.4535\ \sigma_{\phi}\ \text{RSA} - 0.146$$

DISTRIBUTION OF SIZE CLASSES BY FREQUENCY PERCENTAGES

REFERENCE CORE NO.	INT (FT)	-1.000 / 2.000	-.500 / 1.414	.000 / 1.000	.500 / .707	1.000 / .500	1.500 / .354	2.000 / .250	2.500 / .177	3.000 / .125	3.500 / .088	4.000 / .062	PAN PHI / PAN MM.	MEDIAN PHI	MEDIAN MM.	MEAN PHI	MEAN MM.	S.D. PHI	S.D. MM.
24	TOP	0.00	1.23	7.00	13.08	39.47	18.20	8.47	7.78	4.78	0.00	0.00	0.00	.87	.580	.99	.505	.73	1.664
24	-3	0.00	0.00	.35	3.89	20.33	30.00	19.48	11.23	5.21	8.26	1.26	0.00	1.39	.382	1.59	.332	.81	1.757
24	-5	0.00	0.00	0.00	0.00	1.57	34.03	33.25	18.63	6.49	6.02	0.00	0.00	1.69	.311	1.81	.284	.57	1.480
24	-7	0.00	0.00	0.00	0.00	1.20	7.74	39.58	35.61	13.02	2.84	0.00	0.00	2.02	.247	2.04	.243	.46	1.379
24	-9	0.00	1.18	1.78	1.74	21.20	25.01	12.83	11.84	7.86	7.55	9.00	0.00	1.47	.360	1.76	.296	1.05	2.066
24	-10	0.00	0.00	0.00	1.96	4.82	7.58	12.58	16.00	18.07	20.88	18.10	0.00	2.73	.151	2.57	.168	.93	1.900
24	-11	0.00	2.47	5.65	5.56	27.69	19.28	13.16	8.46	8.61	9.10	0.00	0.00	1.15	.449	1.39	.382	.99	1.989
25	TOP	0.00	.03	5.67	39.65	26.76	11.78	4.62	6.53	4.97	0.00	0.00	0.00	.57	.676	.80	.576	.74	1.665
25	-2	0.00	0.00	0.00	.15	2.20	54.91	19.28	6.40	3.87	7.55	5.63	0.00	1.43	.372	1.73	.301	.78	1.718
25	-5	0.00	.07	.56	1.42	14.66	59.10	13.41	6.25	4.52	0.00	0.00	0.00	1.22	.429	1.33	.397	.49	1.400
25	-8	0.00	.07	1.01	2.21	61.96	20.39	6.25	8.11	0.00	0.00	0.00	0.00	.90	.535	1.03	.490	.49	1.406
26	-4	0.00	.43	.98	1.12	7.81	21.53	22.53	23.34	7.15	6.20	8.92	0.00	1.84	.269	1.98	.254	.89	1.848
27	TOP	0.00	6.65	15.81	13.61	21.27	16.04	7.81	10.11	8.71	0.00	0.00	0.00	.85	.555	.91	.532	.98	1.976
27	-2	0.00	0.00	3.01	7.61	36.57	25.61	16.88	6.70	4.56	.06	0.00	0.00	1.04	.485	1.20	.437	.75	1.685
27	-4	0.00	.89	2.03	.27	2.23	15.25	40.40	18.23	6.35	6.93	7.42	0.00	1.84	.280	1.98	.253	.84	1.787
28	TOP	0.00	2.61	4.84	4.29	29.46	27.42	13.19	6.26	6.53	5.39	0.00	0.00	1.12	.459	1.26	.418	.88	1.834
28	-2	0.00	4.86	3.13	3.88	24.00	26.47	12.95	6.45	4.36	6.54	7.35	0.00	1.20	.434	1.46	.364	1.10	2.143
28	-5	0.00	0.00	0.00	0.00	0.00	0.00	1.95	32.45	40.83	24.77	0.00	0.00	2.72	.152	2.70	.154	.40	1.322
29	TOP	0.00	0.00	0.00	2.03	32.24	30.77	14.05	9.89	8.04	2.98	0.00	0.00	1.22	.429	1.42	.374	.70	1.627
29	-3	0.00	.28	2.77	20.48	27.72	21.02	9.13	7.52	10.49	0.00	0.00	0.00	.97	.512	1.13	.458	.82	1.764
29	-6	0.00	0.00	0.00	0.00	0.00	0.00	1.33	21.01	31.35	26.83	19.28	0.00	2.95	.130	2.96	.129	.53	1.440
30	TOP	0.00	7.50	37.91	26.00	12.88	6.87	8.76	0.00	0.00	0.00	0.00	0.00	.06	.960	.27	.832	.66	1.576
30	-10	0.00	4.38	28.23	27.35	14.70	2.68	3.07	5.07	10.32	4.18	0.00	0.00	.33	.797	.72	.607	1.12	2.166
30	-8REP	0.00	1.10	7.84	32.48	22.82	9.65	5.04	2.52	3.25	6.91	8.39	0.00	.65	.638	1.10	.465	1.23	2.340
31	TOP	0.00	0.00	1.95	24.80	32.62	16.44	5.27	5.20	9.85	3.87	0.00	0.00	.84	.560	1.11	.462	.88	1.846
31	-3	0.00	0.00	.04	3.99	23.00	40.78	7.21	4.02	3.38	6.84	10.74	0.00	1.22	.428	1.63	.322	1.02	2.025
32	TOP	0.00	0.00	.32	2.41	32.46	36.76	9.70	4.43	5.83	8.10	0.00	0.00	1.15	.452	1.41	.377	.77	1.702
32	-2	0.00	.29	3.08	2.41	26.86	28.15	16.79	7.04	4.26	7.18	3.94	0.00	1.31	.403	1.50	.352	.91	1.876
32	-7	0.00	0.00	0.00	0.00	.72	1.88	21.62	23.70	22.38	15.10	14.65	0.00	2.54	.172	2.59	.166	.72	1.652
33	-3	0.00	.28	5.01	3.29	20.57	22.75	19.05	18.33	10.75	0.00	0.00	0.00	1.47	.362	1.49	.355	.77	1.708
33	TOP	0.00	0.00	3.07	7.08	34.09	27.91	13.92	8.38	5.57	0.00	0.00	0.00	1.10	.466	1.20	.435	.66	1.582
33	-6	0.00	0.00	4.80	24.27	50.08	16.80	4.06	0.00	0.00	0.00	0.00	0.00	.66	.633	.69	.619	.41	1.329
33	-8	0.00	0.00	0.00	5.65	64.25	16.38	6.63	7.09	0.00	0.00	0.00	0.00	.83	.564	.96	.513	.48	1.396
33	-8	0.00	0.00	0.00	2.42	59.36	19.99	5.57	4.56	8.11	0.00	0.00	0.00	.91	.533	1.13	.456	.64	1.557
34A	TOP	0.00	.89	5.71	27.47	25.14	4.53	5.01	2.74	9.08	10.10	13.59	1.78	.71	.609	1.40	.380	1.38	2.605
34B	TOP	0.00	.26	2.48	17.27	28.78	20.48	17.17	8.87	4.69	0.00	0.00	0.00	1.03	.491	1.13	.456	.71	1.635
34B	-1	0.00	0.00	1.05	5.21	5.42	10.04	11.25	14.56	16.16	14.23	16.08	0.00	2.39	.190	2.29	.204	1.06	2.082
34B	-3	0.00	1.09	9.73	5.90	16.86	20.24	18.62	9.68	9.89	8.03	0.00	0.00	1.39	.382	1.41	.376	1.01	2.019
34B	-4	0.00	0.00	.10	1.18	3.50	28.23	35.79	17.22	8.42	5.57	0.00	0.00	1.71	.307	1.80	.287	.60	1.516
34B	-6	0.00	0.00	0.00	0.00	1.35	37.09	28.46	17.92	8.09	5.09	0.00	0.00	1.64	.320	1.77	.294	.59	1.502
35	-2	0.00	.86	1.44	2.95	11.80	38.28	27.38	9.76	4.94	2.59	0.00	0.00	1.48	.358	1.54	.344	.70	1.629
35	-8	0.00	3.97	5.07	2.56	1.86	10.14	11.39	18.98	15.02	15.44	15.05	0.00	2.39	.191	2.22	.215	1.21	2.316
37	-8	0.00	0.00	0.00	2.88	4.37	27.02	29.08	15.42	9.82	11.41	0.00	0.00	1.73	.301	1.87	.273	.74	1.678
38	TOP	0.00	1.05	15.93	[illegible]	9.88	3.25	4.11	5.75	9.04	2.99	0.00	0.00	.30	.812	.73	.605	1.01	2.018
39	TOP	0.00	0.00	.13	[illegible]	29.84	35.45	14.52	9.01	8.43	0.00	0.00	0.00	1.20	.435	1.36	.389	.64	1.557
39	-4	0.00	0.00	0.00	.14	2.63	21.66	44.15	23.45	7.97	0.00	0.00	0.00	1.75	.297	1.81	.285	.43	1.348
39	-8	0.00	0.00	0.00	.05	1.79	22.84	8.19	6.44	16.90	27.86	14.45	0.00	2.79	.145	2.47	.180	1.01	2.016
39	-11	0.00	0.00	0.00	.03	4.66	3.08	4.07	5.91	8.66	25.41	48.62	0.00	3.45	.092	3.12	.115	.89	1.854
40	TOP	0.00	0.00	.05	1.00	2.03	32.00	21.87	15.87	7.92	6.66	12.54	0.00	1.86	.275	2.08	.237	.88	1.844

DISTRIBUTION OF SIZE CLASSES BY FREQUENCY PERCENTAGES

REFERENCE CORE NO.	INT (FT)		-1.000 2.000	-.500 1.414	.000 1.000	.500 .707	1.000 .500	1.500 .354	2.000 .250	2.500 .177	3.000 .125	3.500 .088	4.000 .062	PAN PHI PAN MM.	MEDIAN PHI	MEDIAN MM.	MEAN PHI	MEAN MM.	S.D. PHI	S.D. MM.
40	-3		0.00	0.00	0.00	0.00	0.00	0.00	6.69	26.65	35.66	25.12	5.88	0.00	2.76	.148	2.74	.150	.49	1.403
41	TOP		0.00	0.00	0.00	1.33	15.60	45.99	18.76	9.70	8.62	0.00	0.00	0.00	1.33	.399	1.48	.359	.57	1.487
41	-2		0.00	0.00	0.00	.92	5.82	36.79	16.86	7.21	6.55	9.99	15.85	0.00	1.66	.316	2.06	.240	1.02	2.021
42	TOP		0.00	0.00	.02	1.69	2.90	37.27	29.95	17.22	10.96	0.00	0.00	0.00	1.63	.323	1.70	.308	.56	1.477
42	-4		0.00	0.00	0.00	.84	3.20	28.22	30.43	20.97	8.27	8.05	0.00	0.00	1.79	.289	1.87	.274	.64	1.560
42	-7		0.00	.88	2.97	5.10	4.33	1.77	6.71	16.80	36.08	20.94	4.42	0.00	2.69	.155	2.39	.191	.98	1.973
44	TOP		0.00	.30	.87	3.17	12.36	26.01	18.14	15.23	17.75	6.18	0.00	0.00	1.65	.318	1.76	.294	.80	1.736
44	-2		0.00	.48	3.24	2.58	2.74	25.77	24.47	20.83	16.15	3.75	0.00	0.00	1.81	.285	1.80	.288	.78	1.716
44	-4		0.00	0.40	.54	1.85	38.78	27.00	12.05	7.54	9.22	3.03	0.00	0.00	1.13	.457	1.39	.382	.71	1.635
44	-6		0.00	0.00	.93	1.84	22.86	41.44	13.71	9.75	9.47	0.00	0.00	0.00	1.23	.427	1.42	.373	.63	1.548
45	-3		0.00	1.46	5.10	16.99	40.61	21.20	8.01	6.58	0.00	0.00	0.00	0.00	.80	.576	.87	.546	.62	1.534
45	-5		0.00	2.10	8.44	38.03	22.27	15.74	7.17	6.25	0.00	0.00	0.00	0.00	.53	.691	.71	.613	.67	1.593
45	-8		0.00	1.11	11.07	26.92	31.95	13.45	7.44	8.06	0.00	0.00	0.00	0.00	.68	.625	.75	.593	.69	1.616
45	-11		0.00	0.00	1.15	1.75	5.31	18.36	14.55	11.94	10.56	19.57	16.81	0.00	2.35	.196	2.35	.196	1.03	2.042
46	TOP		0.00	0.00	0.00	0.00	.29	47.29	25.11	14.27	9.65	3.39	0.00	0.00	1.54	.343	1.74	.298	.55	1.464
46	-4		0.00	0.00	0.00	0.00	.26	34.24	29.91	23.98	11.61	0.00	0.00	0.00	1.75	.297	1.83	.282	.49	1.407
46	-7		0.00	0.00	0.00	.09	1.35	2.79	5.97	21.01	44.66	24.12	0.00	0.00	2.73	.151	2.63	.162	.53	1.445
47	TOP		0.00	0.00	.02	8.70	18.59	41.86	14.76	10.47	5.59	0.00	0.00	0.00	1.22	.430	1.32	.400	.61	1.528
47	-4		0.00	.17	.89	3.07	7.22	49.23	20.27	9.34	7.48	2.34	0.00	0.00	1.37	.386	1.51	.351	.64	1.558
47	-6		0.00	.71	1.27	2.47	11.50	43.36	20.26	9.46	7.97	3.00	0.00	0.00	1.39	.383	1.51	.352	.69	1.610
48	TOP		0.00	.33	6.13	15.51	33.14	23.58	8.15	3.62	6.71	2.63	0.00	0.00	.92	.527	1.06	.479	.81	1.748
48	-3		0.00	0.00	2.18	6.07	33.09	30.38	14.89	8.70	4.74	0.00	0.00	0.00	1.12	.460	1.23	.427	.63	1.545
48	-7		0.00	1.23	3.37	.82	2.18	35.62	30.29	17.38	9.12	0.00	0.00	0.00	1.59	.333	1.63	.323	.66	1.582
49	TOP		0.00	.11	3.43	6.12	34.29	24.46	11.68	7.71	8.83	3.38	0.00	0.00	1.10	.467	1.29	.409	.82	1.763
49	-2		0.00	0.00	.48	3.27	13.19	40.59	26.70	10.32	5.49	0.00	0.00	0.00	1.42	.374	1.47	.362	.55	1.460
49	-4		0.00	0.00	.76	1.22	2.55	32.22	28.62	20.79	9.48	4.35	0.00	0.00	1.77	.294	1.81	.285	.61	1.526
49	-9	10	0.00	0.00	0.00	0.00	0.00	.98	2.33	32.08	33.66	16.03	14.92	0.00	2.70	.154	2.78	.145	.56	1.479
50	TOP		0.00	1.27	10.35	10.45	17.79	20.05	8.71	3.83	3.16	9.07	13.57	3.77	1.19	.437	1.44	.369	1.31	2.483
51	TOP		0.00	.12	.52	2.28	17.72	26.48	28.30	14.32	9.64	.61	0.00	0.00	1.54	.343	1.58	.334	.64	1.561
51	-3	8	0.00	1.26	14.95	6.26	31.61	23.78	12.01	10.09	.04	0.00	0.00	0.00	.95	.518	.95	.518	.74	1.670
52	TOP		0.00	0.00	2.93	4.47	18.45	34.53	18.34	15.27	6.00	0.00	0.00	0.00	1.34	.396	1.40	.379	.66	1.585
52	-2		0.00	4.00	10.41	13.28	26.80	21.26	12.41	6.58	5.26	0.00	0.00	0.00	.91	.533	.95	.519	.84	1.787
53	-4		0.00	0.00	0.00	0.00	42.72	30.51	9.59	6.30	10.19	.68	0.00	0.00	1.10	.468	1.33	.398	.66	1.578
53	-7		0.00	0.00	20.93	13.56	20.04	14.06	8.20	7.55	7.59	0.00	0.00	0.00	.69	.621	.83	.563	.91	1.873
55	TOP		0.00	0.00	0.00	.01	3.35	51.52	24.63	8.56	7.89	4.04	0.00	0.00	1.46	.364	1.64	.320	.57	1.489
55	-2		0.00	0.00	.14	4.13	9.18	41.76	16.39	8.55	3.27	4.96	9.79	1.82	1.39	.381	1.68	.312	.97	1.958
55	-8	10	0.00	5.48	7.21	9.79	31.71	19.42	14.00	8.05	5.74	0.00	0.00	0.00	.98	.507	1.07	.475	.81	1.756
56	TOP		0.00	1.14	4.67	21.05	30.57	20.08	6.53	3.50	4.55	7.91	0.00	0.00	.85	.554	1.09	.471	.94	1.919
56	-4		0.00	.15	1.26	10.74	28.55	27.10	15.08	7.86	7.81	1.39	0.00	0.00	1.14	.452	1.28	.413	.74	1.672
56	-6		0.00	1.03	4.12	19.43	26.33	21.37	11.41	5.53	6.00	4.39	0.00	0.00	.98	.508	1.13	.458	.86	1.819
57	TOP		0.00	.59	3.40	7.22	33.66	25.79	13.69	8.07	7.58	0.00	0.00	0.00	1.08	.471	1.21	.432	.72	1.649
57	-3		0.00	0.00	0.00	0.00	.55	54.50	22.81	10.04	6.93	5.18	0.00	0.00	1.45	.366	1.65	.318	.59	1.501
57	-6		0.00	.40	1.01	.35	.26	2.43	28.15	38.19	15.34	9.14	4.72	0.00	2.19	.219	2.26	.208	.66	1.581
58	TOP		0.00	.03	.37	.73	5.09	43.37	25.70	9.26	8.58	7.12	3.80	0.00	1.51	.352	1.72	.303	.75	1.686
59	TOP		0.00	.35	1.35	1.79	12.06	21.88	23.54	15.43	12.28	11.32	0.00	0.00	1.74	.300	1.83	.280	.83	1.776
59	-6		0.00	0.00	0.00	1.32	18.04	28.39	13.13	9.26	8.01	7.79	13.87	2.20	1.57	.337	1.86	.276	1.09	2.124
60	TOP		0.00	.60	2.05	.35	1.87	3.75	17.40	20.89	26.31	16.05	10.73	0.00	2.56	.170	2.48	.179	.84	1.792
61	-2		0.00	0.00	1.40	7.33	17.79	5.16	7.94	11.01	22.81	18.40	8.11	0.00	2.47	.180	2.13	.228	1.11	2.160
61	-8		0.00	0.00	.01	.95	1.92	6.94	17.76	29.57	34.13	3.71	0.00	0.00	2.39	.190	2.29	.204	.57	1.480

DISTRIBUTION OF SIZE CLASSES BY FREQUENCY PERCENTAGES

REFERENCE CORE NO.	INT (FT)		-1.000 / 2.000	-.500 / 1.414	.000 / 1.000	.500 / .707	1.000 / .500	1.500 / .354	2.000 / .250	2.500 / .177	3.000 / .125	3.500 / .088	4.000 / .062	PAN PHI / PAN MM.	MEDIAN PHI	MEDIAN MM.	MEAN PHI	MEAN MM.	S.D. PHI	S.D. MM.
62	-5		0.00	.28	1.81	5.51	6.20	35.10	21.72	3.84	4.16	7.64	13.73	0.00	1.52	.349	1.84	.279	1.06	2.089
63	TOP		0.00	.13	.54	.99	4.53	46.24	25.15	9.97	5.82	6.64	0.00	0.00	1.47	.360	1.65	.320	.66	1.576
63	-3		0.00	.81	6.14	15.91	25.04	30.03	13.29	8.36	.43	0.00	0.00	0.00	1.03	.489	1.02	.493	.67	1.592
64	TOP		0.00	.52	3.11	2.00	35.57	30.86	18.30	9.24	.41	0.00	0.00	0.00	1.16	.448	1.20	.436	.58	1.494
64	-3		0.00	.24	.90	4.74	24.85	36.29	13.76	9.69	7.87	1.59	0.00	0.00	1.20	.436	1.37	.386	.69	1.609
65	TOP		0.00	1.55	6.36	6.88	29.73	24.51	6.09	2.98	3.46	6.38	12.06	0.00	1.10	.466	1.45	.366	1.21	2.316
65	-3		0.00	.84	4.07	3.36	8.51	46.17	19.84	8.73	7.13	.96	0.00	0.00	1.33	.397	1.39	.382	.71	1.635
65	-6		0.00	0.00	.21	.77	1.32	6.08	10.73	41.84	36.42	2.69	0.00	0.00	2.36	.194	2.29	.204	.52	1.433
66	TOP		0.00	1.85	7.08	32.71	29.22	13.28	6.67	8.21	.97	0.00	0.00	0.00	.62	.651	.77	.587	.71	1.639
66	-2		0.00	.15	5.65	14.85	50.46	17.68	11.11	-.11	0.00	0.00	0.00	0.00	.78	.584	.79	.579	.46	1.379
66	-5		0.00	.12	.95	.90	6.59	47.87	24.47	6.11	5.90	7.09	0.00	0.00	1.45	.367	1.62	.326	.67	1.589
66	-6	10	0.00	.55	11.64	27.96	26.12	11.99	7.82	3.95	5.82	4.15	0.00	0.00	.67	.628	.90	.535	.91	1.879
67	-9		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	3.68	.078	3.70	.077	.11	1.083
68	TOP		0.00	0.00	0.00	.69	1.23	36.35	23.42	21.95	8.84	7.52	0.00	0.00	1.78	.292	1.88	.272	.62	1.540
68	-3		0.00	0.00	0.00	2.28	14.77	40.81	23.64	12.08	6.41	0.00	0.00	0.00	1.41	.375	1.49	.356	.55	1.466
69	-3		0.00	0.00	.17	.53	1.20	3.89	30.15	30.68	19.27	8.86	5.24	0.00	2.22	.214	2.27	.207	.64	1.561
69	-5	8	0.00	0.00	0.00	0.00	.29	2.09	23.29	31.79	29.88	12.67	0.00	0.00	2.40	.189	2.39	.190	.50	1.412
70	TOP		0.00	.30	1.73	2.91	42.69	25.50	8.63	8.07	9.91	.27	0.00	0.00	1.04	.488	1.26	.416	.72	1.645
70	-3		0.00	0.00	.05	.71	1.04	7.44	29.17	30.78	19.34	11.46	0.00	0.00	2.19	.219	2.20	.217	.60	1.519
70	-6		0.00	.00	.56	4.75	24.63	36.59	9.77	7.34	8.62	7.73	0.00	0.00	1.21	.433	1.47	.362	.83	1.772
71	TOP		0.00	1.04	1.38	.87	.35	2.27	13.41	29.32	34.93	15.19	1.63	0.00	2.52	.174	2.44	.180	.70	1.620
71	-3		0.00	0.00	0.00	0.00	0.00	0.00	1.93	37.58	36.33	16.78	7.38	0.00	2.64	.161	2.69	.155	.47	1.381
71	-6		0.00	1.15	3.59	2.26	1.87	21.56	13.31	25.33	21.65	9.28	0.00	0.00	2.14	.227	1.99	.252	.87	1.822
72	TOP		0.00	0.00	.24	3.20	33.12	36.43	13.11	6.54	7.04	.32	0.00	0.00	1.15	.450	1.28	.411	.63	1.546
72	-3		0.00	0.00	.51	2.28	18.71	37.14	21.63	9.58	6.35	3.79	0.00	0.00	1.38	.385	1.51	.351	.66	1.576
72	-5	7	0.00	0.00	.25	1.93	9.09	32.87	28.20	16.09	7.85	3.72	0.00	0.00	1.60	.330	1.68	.312	.63	1.550
73	TOP		0.00	.14	1.05	4.60	36.29	25.73	13.14	7.45	5.71	5.89	0.00	0.00	1.13	.456	1.36	.394	.79	1.728
73	-3		0.00	0.00	0.00	2.38	15.75	32.33	23.69	12.67	8.52	4.66	0.00	0.00	1.49	.356	1.60	.330	.69	1.614
73	-7		0.00	.87	2.91	2.13	2.93	22.02	18.12	25.91	12.16	9.71	3.25	0.00	2.02	.247	1.97	.255	.87	1.832
74	TOP		0.00	.52	3.00	4.09	9.00	26.87	27.08	15.69	8.20	5.55	0.00	0.00	1.60	.330	1.63	.323	.78	1.718
74	-4		0.00	0.00	.28	2.23	3.31	20.46	43.96	19.87	9.40	.48	0.00	0.00	1.74	.300	1.78	.290	.53	1.448
74	-6		0.00	.16	.24	.08	.50	.76	6.79	43.38	31.33	12.70	4.06	0.00	2.48	.180	2.52	.175	.52	1.437
74	-7	7	0.00	0.00	0.00	.62	2.56	27.31	37.84	19.25	8.12	4.31	0.00	0.00	1.76	.296	1.82	.283	.55	1.467
75	TOP		0.00	0.00	1.25	7.80	50.88	23.94	7.65	8.46	.01	0.00	0.00	0.00	.93	.526	1.03	.489	.53	1.440
75	-2		0.00	0.00	0.00	.87	.23	.39	2.24	5.94	25.49	37.52	27.31	0.00	3.18	.110	3.13	.114	.57	1.481
75	-3		0.00	.03	1.59	6.12	49.32	8.08	3.82	4.40	8.23	11.05	7.37	0.00	.90	.537	1.49	.356	1.14	2.204
75	-5		0.00	0.00	0.00	0.00	0.00	.30	1.05	2.00	11.23	37.28	44.39	3.74	3.48	.090	3.27	.104	.76	1.699
76	TOP		0.00	0.00	4.45	3.92	21.24	40.08	11.73	5.22	5.10	8.25	0.00	0.06	1.26	.418	1.40	.378	.83	1.780
76	-3		0.00	0.00	.06	1.29	2.75	30.29	43.75	15.65	6.20	0.00	0.00	0.00	1.67	.314	1.70	.309	.46	1.375
76	-6		0.00	.64	1.37	1.15	2.32	14.39	39.07	27.61	12.81	.44	0.00	0.00	1.83	.282	1.86	.276	.61	1.531
77	TOP		0.00	.04	1.94	25.06	39.84	16.86	5.31	5.82	5.13	0.00	0.00	0.00	.74	.597	.93	.523	.67	1.590
77	-3		0.00	0.00	1.73	1.96	24.93	33.36	20.01	8.66	6.60	2.75	0.00	0.00	1.29	.410	1.43	.372	.67	1.591
77	-6		0.00	.22	2.50	5.42	36.98	29.85	16.10	8.92	.01	0.00	0.00	0.00	1.07	.475	1.14	.455	.57	1.486
77	-8		0.00	.58	6.03	5.10	44.97	26.28	9.78	7.25	.01	0.00	0.00	0.00	.95	.519	1.01	.498	.58	1.498
78	TOP		0.00	.30	1.42	1.78	2.04	1.47	19.49	26.41	31.45	15.65	0.00	0.00	2.46	.182	2.35	.196	.72	1.645
78	-3		0.00	0.00	0.00	0.00	1.31	10.72	18.91	17.50	22.71	20.42	8.43	0.00	2.54	.172	2.47	.180	.75	1.678
79	TOP		0.00	.78	2.00	1.40	.47	2.15	25.68	23.04	22.83	14.33	7.32	0.00	2.40	.190	2.35	.196	.83	1.775
79	-3		0.00	.06	1.78	.12	.32	.85	1.29	17.49	29.54	33.36	15.18	0.00	2.98	.127	2.89	.135	.70	1.620
79	-6		0.00	0.00	0.00	0.00	1.62	2.98	1.69	7.01	19.87	41.17	25.64	.00	3.20	.109	3.09	.117	.64	1.564

DISTRIBUTION OF SIZE CLASSES BY FREQUENCY PERCENTAGES

REFERENCE NO.	CORE INT (FT)		-1.000 2.000	-.500 1.414	.000 1.000	.500 .707	1.000 .500	1.500 .354	2.000 .250	2.500 .177	3.000 .125	3.500 .088	4.000 .062	PAN PHI PAN MM.	MEDIAN PHI	MEDIAN MM.	MEAN PHI	MEAN MM.	S.D. PHI	S.D. MM.
80	TOP		0.00	.50	1.57	2.58	45.58	33.12	8.05	8.61	.00	0.00	0.00	0.00	1.00	.501	1.11	.464	.51	1.425
80	-5		0.00	.22	.89	1.86	4.26	42.99	21.21	16.16	8.64	3.76	0.00	0.00	1.50	.354	1.67	.315	.66	1.580
81	TOP		0.00	0.00	.69	.97	9.78	34.28	27.88	16.18	9.91	.31	0.00	0.00	1.58	.336	1.62	.324	.61	1.523
81	-3		0.00	0.00	.25	2.40	22.23	36.85	17.82	10.75	9.47	.24	0.00	0.00	1.25	.420	1.45	.365	.64	1.558
81	-5		0.00	0.00	1.08	3.30	11.62	40.86	22.48	10.99	9.18	.49	0.00	0.00	1.40	.378	1.51	.351	.63	1.551
82	TOP		0.00	0.00	0.00	.42	.73	15.96	41.24	19.10	8.21	5.33	0.00	0.00	1.89	.269	2.10	.233	.73	1.660
82	-3		0.00	.49	2.68	2.44	5.10	7.13	14.67	19.53	23.52	13.40	11.04	0.00	2.46	.182	2.32	.200	.98	1.970
82	-5	S	0.00	.83	3.07	16.75	44.94	9.61	3.75	4.01	3.90	5.64	6.90	0.00	.80	.574	1.20	.436	1.08	2.117
83	TOP		0.00	.33	1.09	4.10	38.15	25.80	14.74	6.84	7.18	5.77	0.00	0.00	1.21	.434	1.37	.388	.79	1.733
83	-4		0.00	1.49	2.70	3.40	5.74	31.47	25.14	20.12	10.34	0.00	0.00	0.00	1.62	.326	1.61	.328	.73	1.662
83	-6		0.00	.47	1.43	4.30	6.78	8.08	32.13	23.01	17.47	6.33	0.00	0.00	1.94	.261	1.91	.266	.77	1.710
84	TOP		0.00	.20	3.22	14.83	19.03	14.92	16.74	13.23	7.92	9.01	0.00	0.00	1.39	.381	1.46	.364	.98	1.970
84	-3		0.00	0.00	0.00	.23	.57	1.02	14.02	24.19	39.09	17.57	2.71	0.00	2.60	.165	2.57	.168	.53	1.444
84	-7		0.00	0.00	1.78	5.02	25.52	31.79	14.01	7.85	10.52	3.58	0.00	0.00	1.23	.425	1.42	.374	.78	1.713
85	TOP		0.00	0.00	2.26	13.94	45.67	16.90	11.44	3.86	4.15	1.78	0.00	0.00	.87	.546	1.05	.482	.69	1.611
85	-3		0.00	1.03	6.74	23.71	32.74	20.71	7.67	7.40	0.00	0.00	0.00	0.00	.69	.622	.82	.565	.64	1.563
85	-5		0.00	.59	4.35	11.80	43.59	18.43	8.21	7.49	5.53	0.00	0.00	0.00	.78	.581	1.01	.498	.71	1.636
86	TOP		0.00	.11	2.97	8.23	33.47	30.26	11.05	6.35	7.56	0.00	0.00	0.00	1.08	.474	1.10	.439	.70	1.626
86	-3		0.00	.57	2.23	3.97	30.23	29.29	13.72	10.35	6.79	2.85	0.00	0.00	1.19	.439	1.36	.390	.74	1.670
86	-5	S	0.00	4.48	11.40	8.81	27.88	19.67	12.12	9.87	5.77	0.00	0.00	0.00	.95	.517	1.00	.499	.87	1.829
87	TOP		0.00	.72	2.04	9.71	41.38	21.23	6.45	4.45	6.01	8.00	0.00	0.00	.94	.513	1.24	.424	.88	1.845
87	-4		0.00	1.07	4.71	13.86	35.29	17.33	13.21	7.13	7.41	0.00	0.00	0.00	.93	.525	1.08	.471	.79	1.727
87	-6		0.00	0.00	.35	9.39	28.85	34.17	17.58	9.67	0.00	0.00	0.00	0.00	1.16	.446	1.19	.437	.56	1.470
88	TOP		0.00	0.00	0.00	3.46	37.91	31.97	16.06	10.01	0.00	0.00	0.00	0.00	1.11	.463	1.20	.436	.52	1.439
88	-2		0.00	1.95	7.82	13.90	37.89	22.42	8.38	7.63	0.00	0.00	0.00	0.00	.87	.548	.89	.541	.67	1.589
88	-6		0.00	0.00	.61	3.27	31.39	31.82	16.43	7.51	6.77	2.20	0.00	0.00	1.20	.434	1.36	.390	.68	1.597
88	-8		0.00	.20	1.22	6.50	22.58	38.17	15.65	7.83	7.86	0.00	0.00	0.00	1.22	.429	1.34	.396	.65	1.569
88	-11		0.00	.58	4.72	10.54	33.28	21.09	15.77	8.55	5.47	0.00	0.00	0.00	1.02	.495	1.14	.453	.73	1.655
89	TOP		0.00	1.41	5.66	20.11	37.22	17.69	9.50	8.60	0.00	0.00	0.00	0.00	.75	.595	.88	.545	.67	1.591
89	-6		0.00	0.00	0.00	1.77	30.89	23.71	8.48	4.48	6.17	9.33	16.75	2.41	1.27	.415	1.82	.284	1.20	2.305
90	TOP		0.00	3.88	3.68	6.09	22.54	26.06	9.30	4.23	4.93	8.13	11.17	0.00	1.24	.424	1.56	.340	1.20	2.299
90	-8	S	0.00	1.98	5.52	9.61	31.74	27.17	8.90	5.24	6.94	2.93	0.00	0.00	1.02	.494	1.18	.455	.83	1.776
91	TOP		0.00	.23	2.16	6.79	34.76	28.20	14.78	8.01	5.07	0.00	0.00	0.00	1.09	.470	1.20	.435	.64	1.561

APPENDIX C

SEISMIC REFLECTION PROFILES

This appendix contains line drawings of principal seismic reflectors of selected seismic reflection profiles from the Barnegat and Little Egg Inlets regions. The approximate position and extent of these profile sections are shown in Figures C-1 and C-2. The vertical scales are in feet and meters and are based on a sound velocity of 1463 meters in water and 1658 meters in sediments. Horizontal scale is variable because of dependence on survey boat speed. The approximate scale can be judged by reference to the plots in Figures A-1 and A-2. On each profile the first line below the zero line is the bottom water interface; all deeper lines are subbottom reflectors.

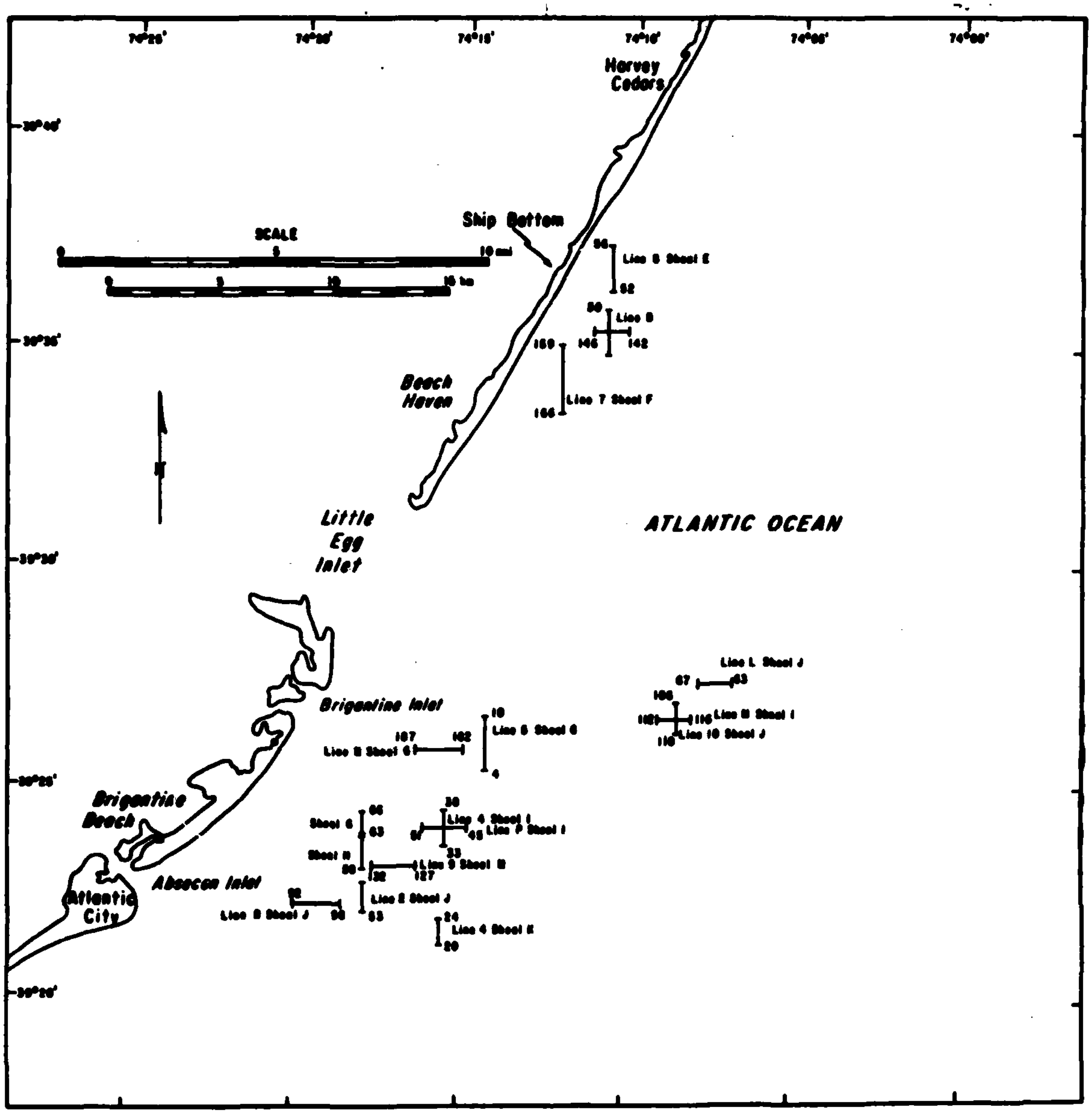


Figure C-1. Parts of seismic reflection profile lines shown in this appendix; Little Egg Harbor area.

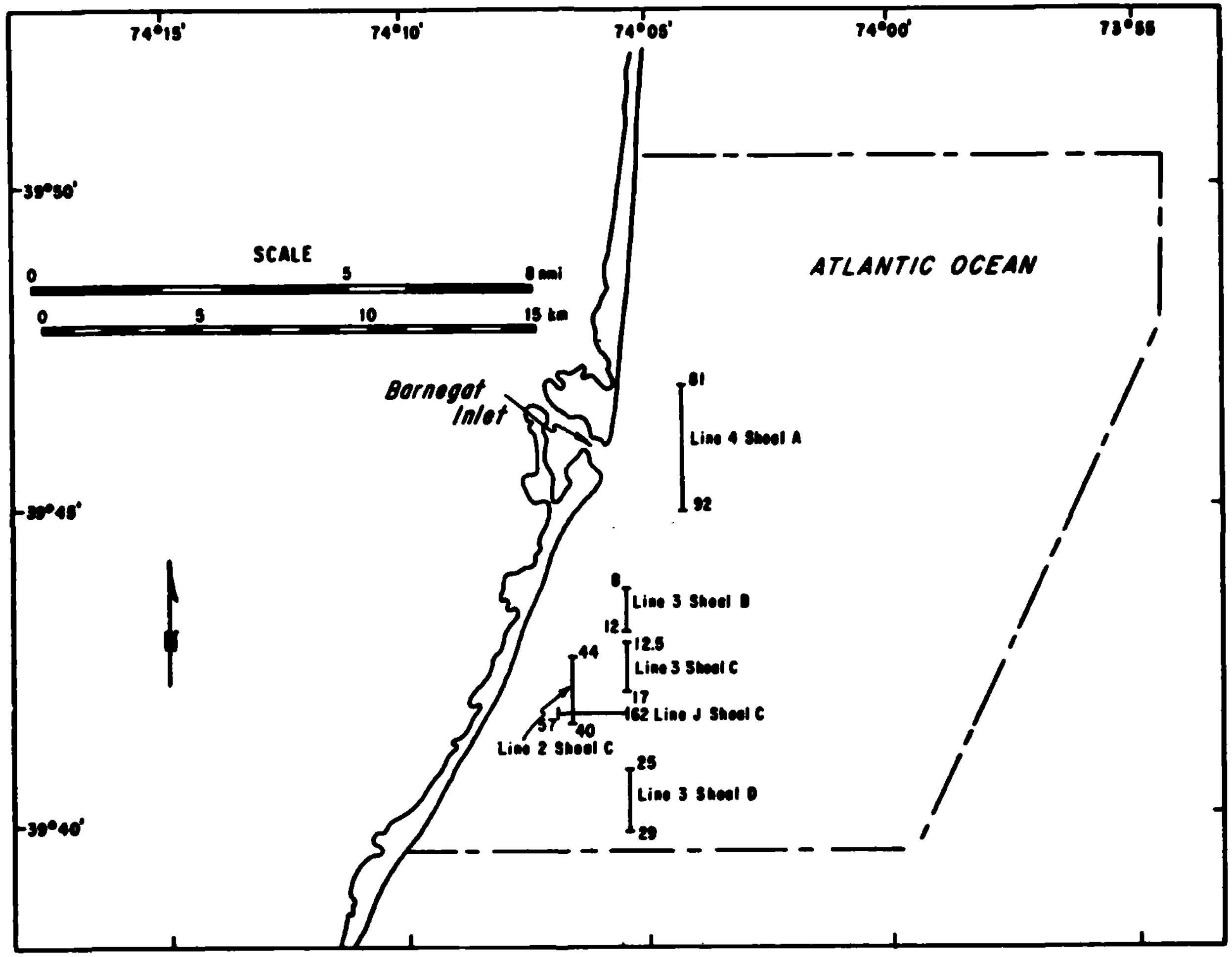
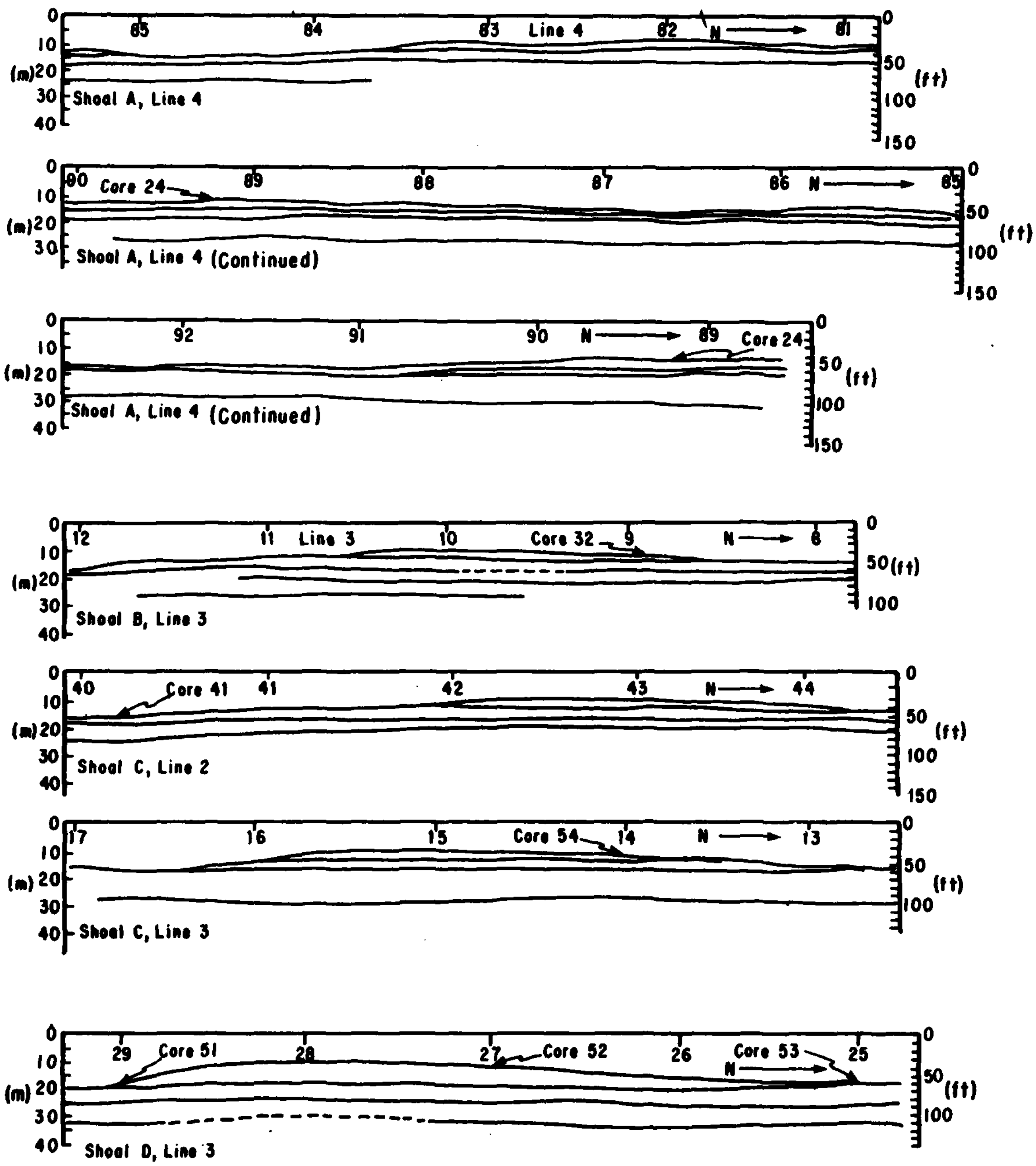
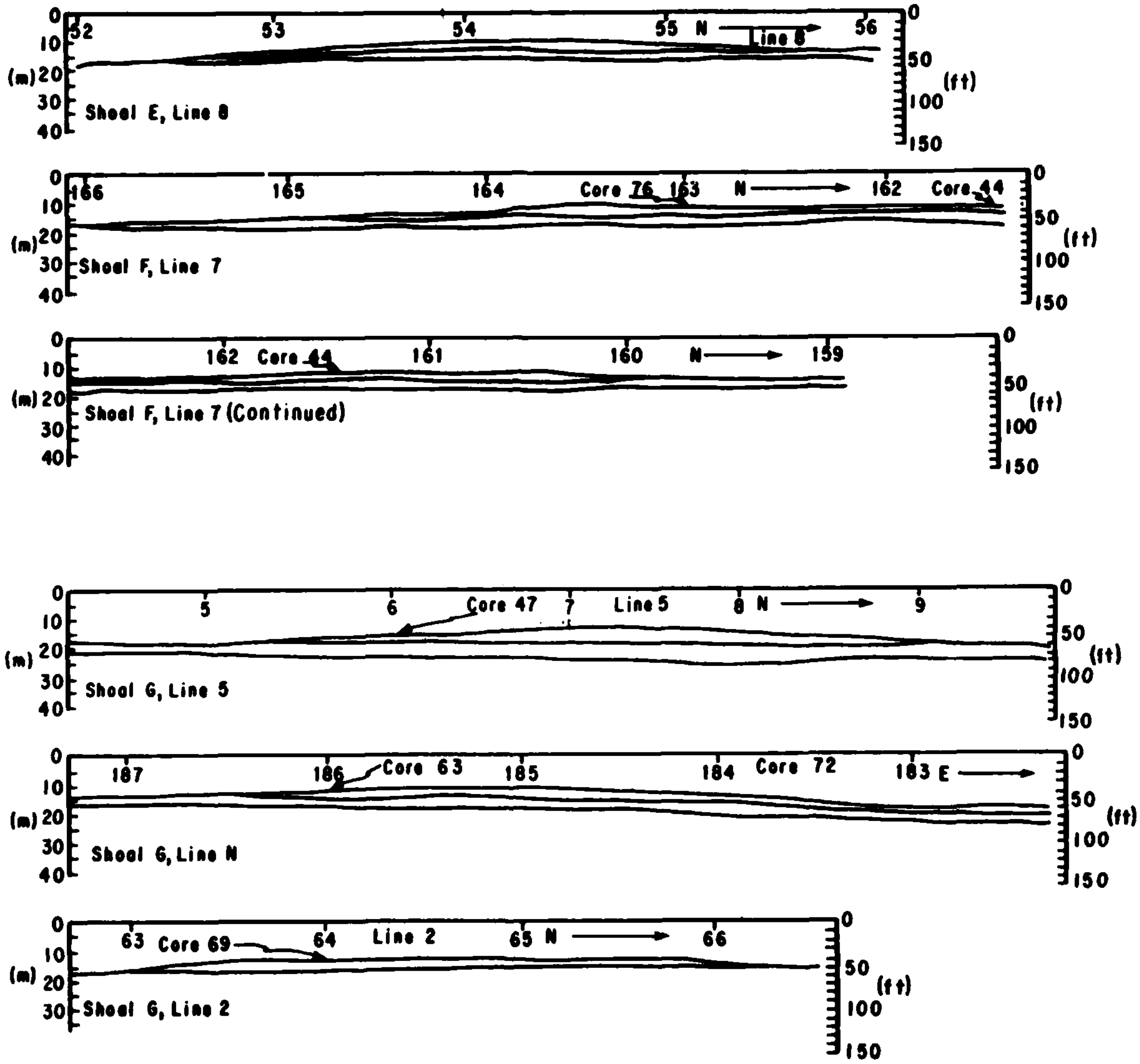
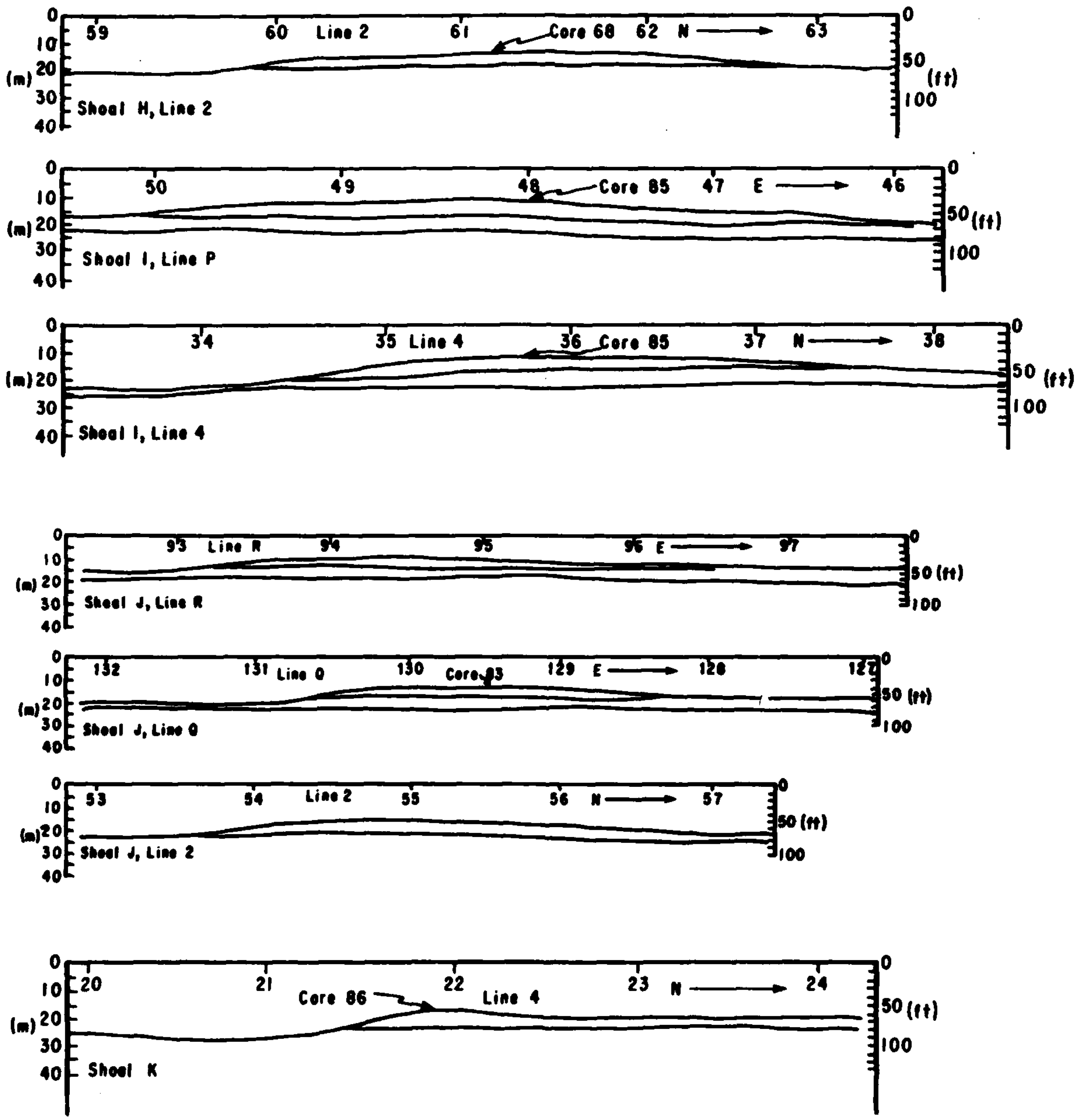


Figure C-2. Parts of seismic reflection profile lines shown in this appendix; Barnegat area.


Shoal A, Line 4
Line 4
85 84 83 82 81
N
(m)
(ft)
0 10 20 30 40
0 50 100 150
Shoal A, Line 4 (Continued)
90 89 88 87 86 85
Core 24
Shoal A, Line 4 (Continued)
92 91 90 89
Core 24
Shoal B, Line 3
Line 3
12 11 10 9 8
Core 32
Shoal C, Line 2
40 41 42 43 44
Core 41
Shoal C, Line 3
17 16 15 14 13
Core 54
Shoal D, Line 3
29 28 27 26 25
Core 51
Core 52
Core 53


Shoal E, Line 8
Line 8
Core 76
Core 44
Shoal F, Line 7
Shoal F, Line 7 (Continued)
Core 47
Line 5
Shoal G, Line 5
Core 63
Core 72
Shoal G, Line N
Core 69
Line 2
Shoal G, Line 2
(m)
(ft)



Shoal H, Line 2
Line 2
Core 68
N
(m)
(ft)
Shoal I, Line P
Core 85
E
Shoal I, Line 4
Line 4
Core 85
N
Shoal J, Line R
Line R
E
Shoal J, Line Q
Line Q
Core 83
E
Shoal J, Line 2
Line 2
N
Shoal K
Core 86
Line 4
N

Meisburger, Edward P.
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[48] p. : ill. ; 28 cm.—(Miscellaneous report / Coastal Engineering Research Center ; no. 82-10). Cover title.
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Report is one of a series describing results of the Inner Continental Shelf Sediment and Structure (ICONS) study which main objective is locating and delineating offshore sand and gravel deposits suitable for beach restoration and maintenance. This study represents three survey areas off the central New Jersey coast.
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